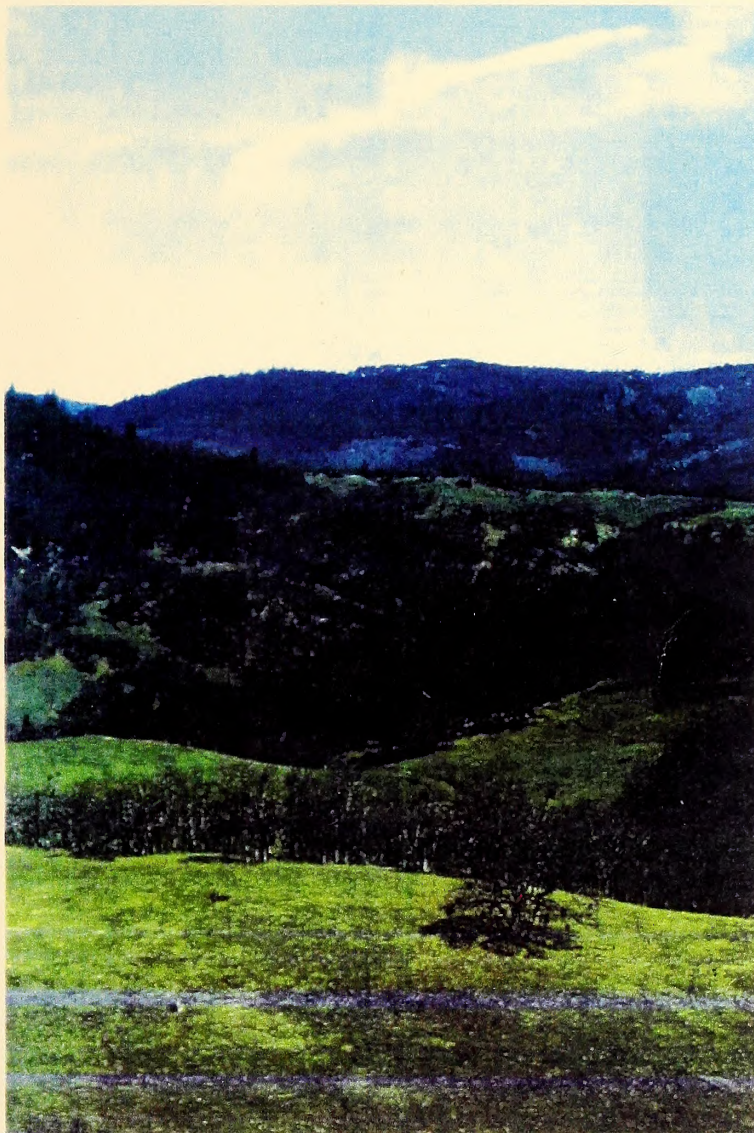




THE BUCKSKULL SITE, CA-HUM-718

An Upland Middle Period Chert Processing Camp



By

Marlene L. Greenway, Beth Elstien, and Eric W. Ritter

with a Preface by William R. Hildebrandt



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Report based on paper presented at the Society for California Archaeology "Archaeology of Northern California" Symposium, 1990, and revised by Greenway and Ritter before 2006

2015



Figure 1. A researcher measuring the diameter of a tree trunk in a forest. The diameter is measured at a point where the trunk is free of buttresses, major scars, and other irregularities. The measurement is taken at a point where the trunk is free of buttresses, major scars, and other irregularities.

TABLE OF CONTENTS

	<u>Page</u>
Table of Contents	iii
List of Figures	iv
List of Maps	iv
List of Tables	iv
Preface (William R. Hildebrandt)	v
Acknowledgements	1
Abstract	3
Introduction	3
Environmental setting	3
Landform	3
Climate	4
Soils and Vegetation	4
Fauna	6
Ethnogeography	6
Archaeological Background	8
Site Description	10
Field Methods	10
Data Collection Procedures	10
Artifact Analysis Methods	13
Debitage (Elizabeth R. Elstien)	13
Introduction	14
Methodology	14
Debitage Categories	14
Measurements	17
Heat Treatment	17
Assemblage Data	19
Cores	22
Modified Flakes	22
Bifaces	28
Secondary Edge Modified Flakes	32
Projectile Points	33
Battered Stone	40
Ground Stone	40
Obsidian XRF Sourcing and Hydration Discussion	40
Conclusions	43
Bibliography	46
Appendix A-Obsidian Sourcing	51
Appendix B-Obsidian Hydration	55

LIST OF FIGURES

	<u>Page</u>
Figure 1-Debitage Categories	16
Figure 2-Debitage Chart	18
Figure 3-Tabular Chert Core.....	23
Figure 4-Edge Modified Flakes	24
Figure 5-Bifaces.....	31
Figure 6-Leaf-Shaped Point.....	35
Figure 7-Projectile Points	36
Figure 8-Projectile Point Fragments	37
Figure 9-Projectile Point Fragments	38
Figure 10-Projectile Point and Point Fragment	39
Figure 11-Hammerstone	41
Figure 12-Milling-Grinding Slab.....	42

LIST OF MAPS

Map 1—Eaton Rough Project Area	2
Map 2-North Coast Ranges Ethnographic Groups	7
Map 3-General Site Location.....	11
Map 4-Site Map	12

LIST OF TABLES

Table 1-Debitage Frequencies/Percent's, Unit 1, 0-20 cm	19
Table 2-Debitage Frequencies, Unit 1, 20-40 cm	20
Table 3-Gross Chert Flake Sizes, Unit 1, 0-20 cm	21
Table 4-Gross Chert Flake Sizes, Unit 1, 20-40 cm	21
Table 5-Chert Modified Flakes, Unit 1, 0-20 cm.....	26
Table 6-Chert Modified Flakes, Unit 1, 10-20 cm.....	27
Table 7-Chert Bifaces	29
Table 8-Chert Edge Modified Bifaces	30
Table 9-Projectile Point Statistics.....	33

PREFACE

The interior of northwest California saw a significant amount of work during the 1980s. Much of this occurred relatively close to the Buckskull study area, including upland settings on Pilot Ridge and South Fork Mountain, as well as lowland settings along the Trinity River. As summarized in this document, excavations at these locations revealed a great deal of land-use pattern change over time, resulting in a series of hypotheses regarding the origin of intensive salmon-acorn economies and the establishment of sedentary village life in the lowlands. It was proposed that during much of the Middle Holocene (about 8200-4200 cal BP) people lived in small mobile groups using a wide range of upland and lowland resources as they became seasonally available. Referred to as the Borax Lake Pattern, this adaptation was assisted by warm-dry conditions which allowed highly productive oak-woodland vegetation associations to migrate up into high elevation areas, making these areas especially lucrative for local human populations. Much of the Borax Lake Pattern archaeological record was composed of multi-activity residential areas, both in lowland and upland settings.

After about 4200 cal BP, climate became cooler and wetter, and dense conifer forests began to cover the upland areas, lowering the yield of these habitats. Productivity of the salmon fishery may have improved, however, as stream flow increased and persisted for longer periods of time, especially in the small tributaries where much of the spawning took place. The archaeological record dating to between about 5000 and 1400 cal BP, known as the Mendocino Pattern, differed significantly from the preceding one, as many of the upland sites shifted from being residential in character to more specialized, hunting oriented camps. Although no data were available from lowland sites, it was hypothesized that people began to establish more permanent lowland villages focused on the storage of salmon and tan oak acorns, while the uplands were used on a much more limited basis than before. Finally, after about 1400 cal BP, it was hypothesized that the Gunther Pattern had an even greater focus on the lowlands, and the intensive, storage based economies documented by the ethnographic record emerged.

The lack of a lowland archaeological record obviously made it difficult to evaluate the efficacy of this hypothetical model of land-use pattern change, and this paucity of information remained the case during the investigations at the Buckskull site. This situation was later remedied by the work of Shannon Tushingham during the 2000s along the Smith River. Although a significant distance from the present study area, her findings are pertinent for all of northwest California. She found that lowland occupation intensity did increase during Mendocino Pattern times, but much of it was geared toward the storage of acorns and less so on salmon. After 1400 cal BP, the size of local village sites increased significantly and the full-blown salmon-acorn complex emerged.

So why was there a time lag between the intensive use of acorns and salmon? According to Tushingham, the answer lies in the sequence of labor inputs required. Acorns are a *back-loaded* resource. Initial collection and storage is relatively cheap and easy, and only gets expensive later on when they need to be processed for consumption (ground, leached, and cooked). So as Mendocino Pattern people began to experiment with higher levels of sedentism and storage, creating multiple, low-cost caches of acorns enlisted minimal risk, because if they needed to be abandoned, the loss would be minimal. Salmon, in contrast, is a *front-loaded* resource. They are more difficult to acquire than acorns and, more importantly, they must be smoked/dried for storage right way. Once

this expensive upfront work is completed, there is little effort required during the later consumption side of the process. Because of this upfront expense, salmon caches were much more valuable than acorn caches, and tended to tie people down in a much more significant way during Gunther Period times than was case before.

Investigations at the Buckskull site contribute to these patterns in a variety of ways. First most of the projectile points at the site correspond to the Mendocino Pattern, placing it within this interval. As pointed out by the authors, it represents more than a specialized flaked stone production/hunting camp because it also includes a minimal amount of battered and ground stone tools. This finding consistent with the expectations of Tushingham, as land-use patterns were still relatively flexible at this time. Second, very few quarry sites have been investigated in northwest California, so the Buckskull site gives us a firsthand look at the production patterns that took place there. One of the more interesting findings reported by the authors is that bifaces are much more common than cores, and over half of the bifaces have been thinned. This finding, combined with abundant biface thinning flakes and worn out tools replaced there, may show that people were refining their toolstone in preparation for a significant trip away from the site, which would also be consistent with a relatively flexible settlement system at this time. Finally, the lack of late period Gunther Barbed (Tuluwat) projectile points may reflect a contrasting pattern, with local people collecting chert from the site and processing at a nearby residential base when populations densities were higher and residential mobility reduced.

None of these proposals can be fully evaluated with data from a single site, especially one dominated by chert quarrying debris. But with every new set of data reported, one more piece of the prehistoric puzzle is made available. This document is another one of those pieces, and the authors should be applauded for their fine work, and willingness and effort to share it with others.

William R. Hildebrandt

Far Western Anthropological Research Group, Inc.

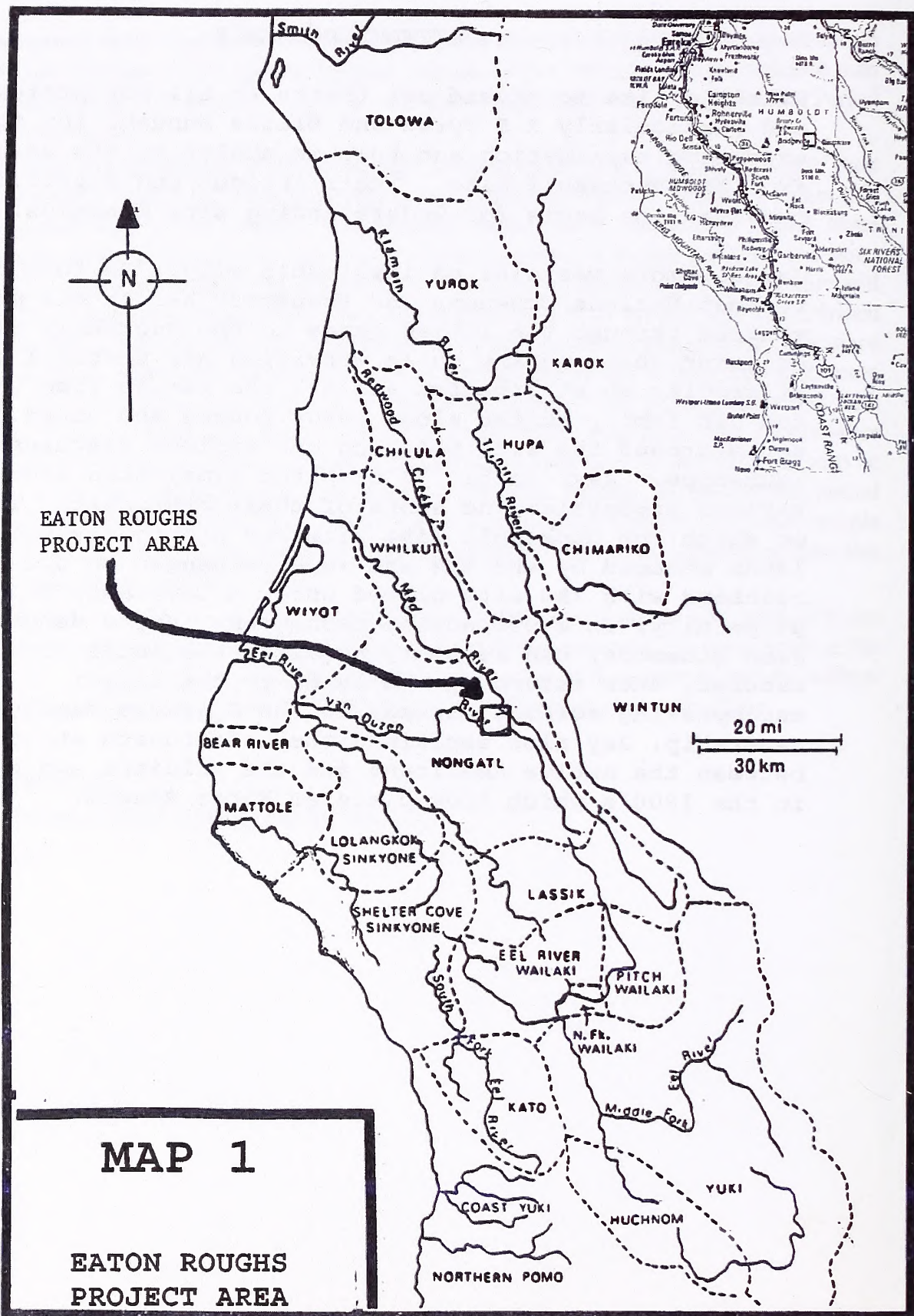
Davis, California

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ACKNOWLEDGEMENTS

We would like to extend our thanks to all the professionals and particularly K D Tyree and Elaine Sundahl for their extensive examination and help in analyzing the assemblage from the Buckskull Site. Their insight and expertise provided the basis for understanding site dynamics.

Jay Dinsmore was also an invaluable ally. He took the time to meet Marlene Greenway and transport her in his personal vehicle through the locked gates to the Buckskull Site and adjacent chert quarry while providing his personal account of growing up at Dinsmore and all the places from which he and his family hunted along Eaton Roughs and hiked the acres around the site pointing out various features of the landscape. Jay, in his 70's at the time, also showed various properties and spoke of their ownership. The land on which the Buckskull Site sits was previously public lands managed by the BLM and were exchanged to private ranchers with the site placed under a Covenant, in perpetuity, as a protection mechanism. Jay's daughter, Jane Dinsmore, had recently acquired the lands from the rancher, thus returning the lands to the larger encompassing acreage already in the Dinsmore family ownership. Jay also explained the unfortunate encounters between the native Americans and the soldiers and settlers in the 1800's which took place at Eaton Roughs.



THE BUCKSKULL SITE, CA-HUM-718,
AN UPLAND MIDDLE PERIOD CHERT PROCESSING CAMP

Marlene L. Greenway, Elizabeth R. Elstien, and Eric W. Ritter

ABSTRACT

The Buckskull Site is located at Eaton Roughs, part of the northwest trending ridge system between the Van Duzen and Mad Rivers. This bench site appears to be a predominantly Middle Period camp emphasizing chert tool manufacture. Testing suggests extreme quantities of lithic reduction debris including large numbers of biface fragments and some uniface fragments. Very few complete tools were recovered. Debitage analysis demonstrates evidence of heat treatment and intermediate to advanced stages in the reduction sequence. Using regional projectile point typologies, Buckskull specimens fit well with points from the Oregon, McKee Uniface, and Mendocino Series.

INTRODUCTION

The Buckskull Site, CA-HUM-718, was located and recorded by Francis Berg, Ukiah District Archaeologist for the Bureau of Land Management (BLM), in 1982. This report presents results of analyzing data gathered in 1985 when the site, part of a three-way land exchange involving the BLM and two private parties, was evaluated for eligibility to the National Register of Historic Places under Section 106 (36 CFR 800) review.

The study area is located adjacent to Eaton Roughs above and between the Van Duzen and Mad Rivers in southern Humboldt County just north of Dinsmore off Highway 36 (See Map 1). The site is less than 1 and 3/4 miles northeast of the Van Duzen, about 2 miles west of the Mad River, and less than seven (7) miles southwest of Pilot Ridge in ethnographic Nongatl territory. Eight Mile Ridge separates the Eaton Roughs Ridge from Pilot Ridge and South Fork Mountain. This report relies on the results of analysis of those areas by Hildebrandt and Hayes (1983, 1984) because of similar terrain, elevations, environment, and cultural materials.

ENVIRONMENTAL SETTING

Landforms

Eaton Roughs is a highly dissected badlands with true barrens. The Buckskull Site is located on a ridge system

at an elevation of 3680'. The ridge rises at Dinsmore and continues in a northwest line to Soldier's Grove and on to the edge of Arcata. The ridge system trends northwest and is parallel to and southwest of Pilot Ridge and South Fork Mountain, all situated between the Klamath Mountains and North Coast Ranges Provinces which consist of rugged ridgelines and small intermontane valleys.

The site is situated on a fairly large flat below a forested butte and has a northeastern aspect with limited water. The water in the small seasonal drainage comes from melting snows which are present even in late March. Downcutting on the east and north sides of the site, the drainages empty into Mule Basin Creek.

The geology of the area is typical of the Coast Range Geologic Province consisting of highly faulted and warped sedimentary members of the Jurassic aged Franciscan Formation. Mineral potential within the Franciscan Formation is generally poor with the project area being exceedingly poor. The Van Duzen and Mad Rivers drain to the northwest conforming to the geological structure of the region.

Cherts suitable for tool production are available at a large outcrop adjacent to and less than 1/4 mile uphill from the site. These cherts are found in a wide variation of colors and qualities.

Climate

Classified as having a Mediterranean climate, the region is characterized by dry summers and wet winters (Elford and McDonough 1964). For the Eaton Roughs area, winter may last from October through May and into June. Heavy snowfall is normal and, at this elevation, there are usually less than 175 frost free days (Elford and McDonough 1964). Temperatures are influenced by distance from the ocean and altitude. Mean annual precipitation is 55 to 75 inches (USDA, et al, 1959).

Soils and Vegetation

The Buckskull Site vicinity is ecotonal in nature given that there are grassy meadow-like areas, stands of California Black Oak (Quercus kelloggii), Oregon White Oak (Quercus garryana), and Hazelnut (Corylus cornuta var. californica) abutting sedimentary rock outcrops interspersed with small intermittent drainages. An immature forest of Douglas-fir is establishing itself on the site and there are many young Juniper (Juniperus communis) present. The majority of the region is dominated by Douglas-fir Forest, Coastal Prairie, and Northern Oak Woodland communities (Munz, 1968:16,17).

Soil depths at the site may be as much as 3 to 4 feet. There is less than 30% slope in the site vicinity and only about 3% on the site with rolling hillocks. The soil, Yorkville Series, has slow permeability with imperfect drainage and high erosion qualities not considered suitable for timber production (USDA, et al, 1959).

The 0-20cm excavation level revealed a deposit characterized as a friable gravelly loam with low clay content. Moist color reading on a Munsell Soil Color Chart was 10 YR 2/2, Very Dark Brown. Krotavina were encountered at the base of this layer. This bioturbation resulted in a mottled soil as the burrows contained the lighter color soil of the inferior level. Abundant fine rootlets and occasional insect larvae were found in the matrix. River worn cobbles, charcoal and carbonized wood were encountered infrequently.

The 20-40cm excavation level had a soil structure similar to the superior level although it was more moist and somewhat lighter in color, i.e., 10 YR 3/3, Very Dark Grayish Brown. Rootlets, larvae and charcoal were less evident. Small cobbles, however, were more frequent within a size range of 8 to 12cm in diameter. A large boulder was revealed in the east wall of the unit.

James West (In Hildebrandt and Hayes 1983) carried out pollen analysis at CA-HUM-558 on Pilot Ridge at about the same elevation as the Bucksull Site. One of West's research questions concerned the presence of "grassland interspersed with small stands of oak and pine" "in an area that receives some 40-80 inches of precipitation yearly and surrounding vegetation is a dense coniferous forest" on ridgetops and adjacent slopes of California's North Coast Ranges. West used two factors, climate and fire, which can be discerned from sediment cores, to address the problem; his research at CA-HUM-558 suggests a change in forest composition and

vegetation some 2500-2800 radiocarbon years ago. The change is from a warmer period, in which plant zones were some 300 meters higher and temperatures were 1.3-2.1 degrees C. warmer than today, to a cooler-moister period in which plant zones shifted downward and southward. (1983:3.20).

Therefore, according to West's conclusions, at about 2800 B.P., the mixed evergreen forest established itself in the study area when there was a shift from a warmer/drier climate (the Xerothermic) to a cooler/mesic one (the Neoglacial) leaving remnants of grassland interspersed with groves of oak and pine at the higher elevations. The

Xerothermic was a global event hypothesized to have taken place from 8500 to 3000 B.P. while the Neoglacial was a more localized series of events.

Fauna

For the larger area prior to and during the contact period, elk and grizzly bear were present but are now missing. However, blacktailed deer, black bear, mountain lion, bobcat, coyote, and many smaller mammals are present along with a variety of birds and various migratory fowl. Fish in the rivers below include steelhead, lamprey, two kinds of salmon, trout, and western sucker. In his Catchment Analysis at Pilot Ridge, Dwight Simons suggests that during the Xerothermic

...the Pilot Ridge resource procurement zone would have had high tree crop productivity, high deer productivity, low anadromous fish productivity, low elk productivity, and a great diversity of plant and animal resources. (in Hildebrandt and Hayes 1983:3.49)

He goes on to say that under those conditions, the area would have been occupied to some extent all year long. However, during the Neoglacial, winter deer range probably occupied valleys and the lowermost slopes of the area and there would have been

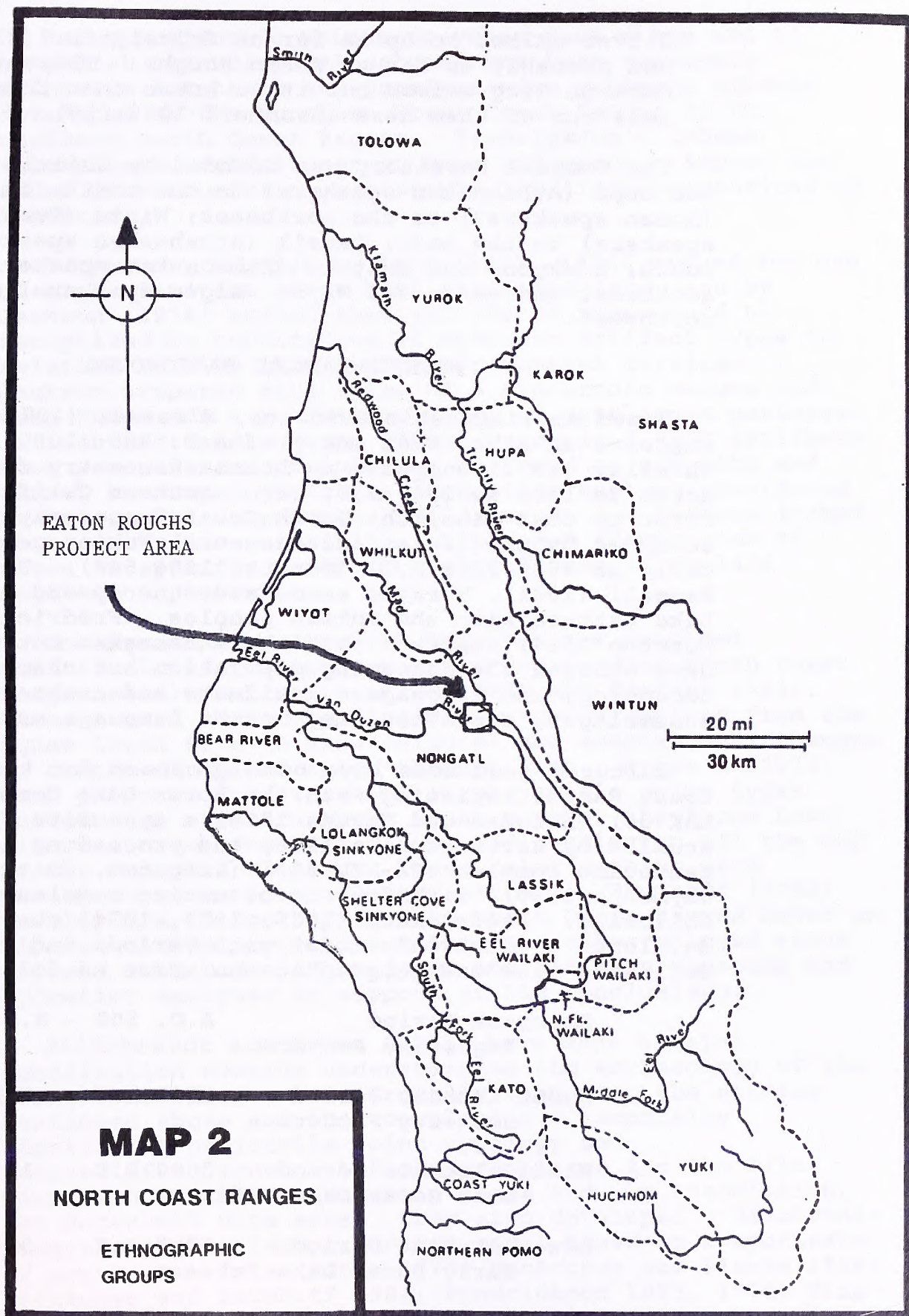
low tree crop productivity, low deer productivity, very high anadromous fish productivity, high elk productivity, and a relatively low diversity of plant foods. (ibid.)

The upland areas would have been used only during the summer with groups settling along major streams the rest of the year.

ETHNOGEOGRAPHY

The study area is within ethnographic Nongatl territory as recorded post-European contact (see Map 2). Northernmost of the five Athabascan southern dialect groups, Nongatl territory is drained "by three right-hand affluents of the Eel River: Yager Creek, Van Dusen Fork, and Larrabee Creek; also the upper waters of Mad River" (Kroeber 1925:143). To illustrate the importance of these waterways and their fish populations, the Nongatl are assigned 85 miles of stream fishing in a territory of 855 square miles (Baumhoff 1958:219, 220).

Steelhead go up as far as Eaton Roughs (40 mi.).



Silver salmon go up as far as Grizzly Cr. (21 mi.) and probably as far as Eaton Roughs. There are no data on King salmon but it is known that there is a fall run of them here (Baumhoff 1958:219).

The Nongatl territory was bounded by Chilula Whilkut and Hupa (Athabaskan speakers) to the north; Chimariko (Hokan speakers?) to the northeast; Wintu (Penutian speakers) to the east; Lassik (Athabaskan speakers) to the south; Sinkyone and Mattole (Athabaskan speakers) to the southwest and west; and Wiyot (Algic speakers) to the northwest.

ARCHAEOLOGICAL BACKGROUND

Based on linguistic evidence, Elsasser (1978:194) suggests an Athabaskan entry of A.D. 900 (1000 B.P.) and Whistler (1979) suggests an Athabaskan entry from the north as late as 1300 A.D. into northern California. Prior to that time, the North Coast Ranges may have been occupied by pre-Yukian and ancestral Yukian peoples as early as 9500-9000 B.C. (Moratto 1984:544). Referring to Basgall (1982), Moratto associates the spread of the Borax Lake Pattern with the Yukian peoples. Fredrickson (in Moratto 1984) suggests that the Athabaskan entry may not have changed the occupying population but changed their technology and language. Artifacts and archaeological assemblages, therefore, may not be language associated.

Cultural sequences have been proposed for the North Coast Ranges beginning with the Borax Lake Complex (CA-LAK-36) (Meighan and Haynes 1970) a type site first studied by Harrington in 1948, and proceeding to the Mendocino Complex (CA-MEN-500) (Treganza, Smith and Weymouth 1950), with four co-occurring complexes following. Fredrickson (1955, 1973, 1974) thereafter developed a diachronic model with Periods and Patterns to delineate time and geographic use areas as follows:

Emergent Period	A.D. 500 - A.D. 1800
Augustine Pattern	
Upper Archaic Period	1000 B.C. - A.D. 500
Berkeley Pattern	
Middle Archaic Period	3000 B.C. - 1000 B.C.
Late Borax Lake Pattern	
Lower Archaic Period	6000 B.C. - 3000 B.C.
Early Borax Lake Pattern	
Paleoindian Period	10000 B.C. - 6000 B.C.
Post Pattern	

Using projectile points to cross-date sites and to establish chronological schemes has been extremely effective but there are problems with applying schemes developed in the southern North Coast Ranges to the northern North Coast Ranges. Fredrickson's scheme incorporated differences in time and space. Aspect was added in recognition of possible localized expressions of Patterns.

Subsequent studies by King (1973, 1974) argued for use of high elevation sites both early and late, and by Jackson (1976) argued that periods of time could be recognized by occurrences of specific artifact types in relation to site types and environmental settings.

Jackson proposed site types of a synchronic nature and used these for a prediction model of settlement patterns.

Hildebrandt and Swenson (1982) recognized that artifacts from several time periods may be found at one site and cannot be lumped together; such sites must be considered to have multi-components. Hildebrandt and Swenson looked at co-occurrence of artifact types and frequencies of sites in specific environmental settings to explain settlement patterns.

The Squaw Creek Site (CA-SHA-475) has provided additional information towards understanding North Coast Ranges settlement patterns (Clewett and Sundahl 1983). Clewett used the archaeological evidence derived from the Squaw Creek Site to show cultural and adaptational changes in usages of upland sites through time. Wylie's (1976) work proposed relationships in projectile point types between the northern North Coast Ranges, the Borax Lake site and sites found in Oregon and Washington all the way to the Columbia Plateau. These relationships were perceived as part of a larger pattern. Baumhoff (1982) developed a chronology for the North Coast Ranges based on time sensitive projectile points and other chipped stone objects with radiocarbon dates and obsidian sourcing and hydration analysis in support of his conclusions.

Hildebrandt and Hayes (1983) have made a major contribution towards understanding the archaeology of the North Coast Ranges by thoroughly examining the studies mentioned above and then developing a temporally significant projectile point typology and temporal/functional artifact assemblages for the Pilot Ridge and South Fork Mountain areas and, by association, the Buckskull Site area. They also developed a diachronic subsistence/settlement pattern model based on a synthesis of previous models (Cohen 1979; MacArthur and Pianka 1966; Bettinger and Baumhoff 1982; Fredrickson 1973, 1974; King 1974; Clewett 1974; Whistler 1977, 1979; Hildebrandt and Swenson 1982; West 1981; Binford 1980, 1982). Their synthesis incorporated information on environmental

change, population movements, social organizational change, and site formation processes. The model was used to test sites along Pilot Ridge northeast of the Buckskull Site.

SITE DESCRIPTION

CA-HUM-718, the Buckskull Site is located on the 1978 USGS 7.5' Showers Mountain topographic quadrangle (Zone 10, UTM 443,680mE/4,485,740mN), T2N/R4E, northeast 1/4 of the northeast 1/4 of the northeast 1/4 of the southeast 1/4 of Section 25, Humboldt Base Meridian (See Map 3). Lithics and groundstone mark the site (See Map 4) which is in a black oak grove on a flat with a northeast aspect quite removed from a source of water other than a small intermittent drainage below the Eaton Roughs ridgeline. Elevations at the site vary from 3600 to 3680 feet. Amelia Butte is 760 meters to the east and a service road is about 250 meters east of the site while Mule Basin Creek is about 400 meters to the west.

FIELD METHODS

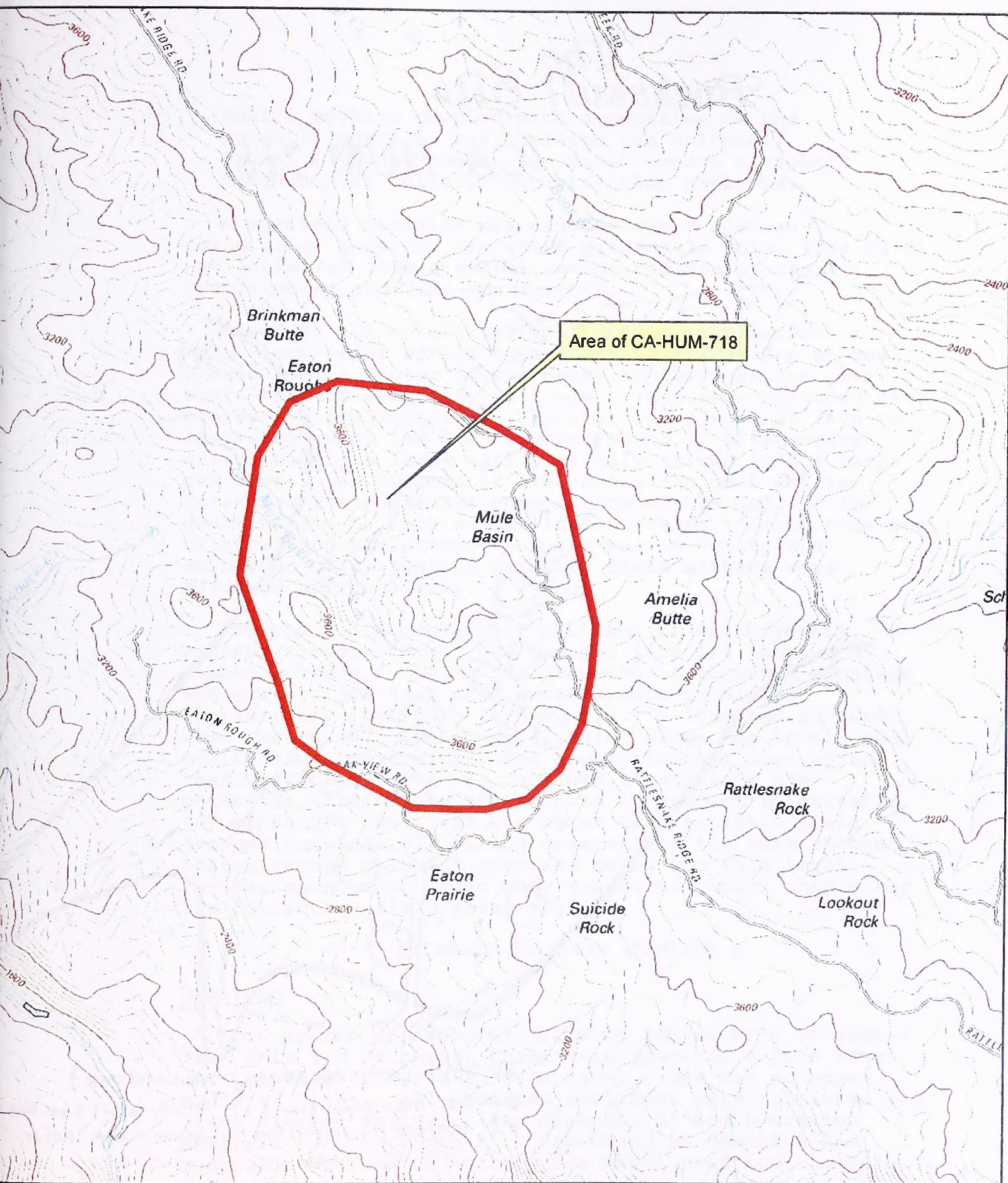
Data Collection Procedures

The surface of the site was examined and limited test excavations were carried out in 1985 by a team consisting of Dr. Eric Ritter, Redding Resource Area Archaeologist; Francis Berg, Ukiah District Archaeologist; Bruce Dawson, Ukiah District Botanist; and Joanna Holmes, Arcata Area Forest Ecologist.

To determine the maximum horizontal extent of the site, all existing exposures of mineral soil, e.g., root wads of fallen trees, stream cut bank, animal burrows, were carefully examined. Random shovel scrapes of the herbaceous surface were employed across the balance of the area to allow increased visibility of the potential site.

This procedure resulted in some new information regarding the areal extent of CA-HUM-718:

- a. The cultural deposit extends intermittently to the main drainage.
- b. A lithic workshop area is located adjacent to the southeast corner of the originally recorded site.
- c. The northern one-half of the site has a lower density (less than two flakes per square meter) of surface and near-surface materials. This difference is somewhat enigmatic since this particular area is more gently sloping. Perhaps colluvial activity, i.e., denudation of the



0 0.25 0.5 0.75 1 Miles

Showers Mtn. 24k Quad

Map 3 Archaeological Site Location

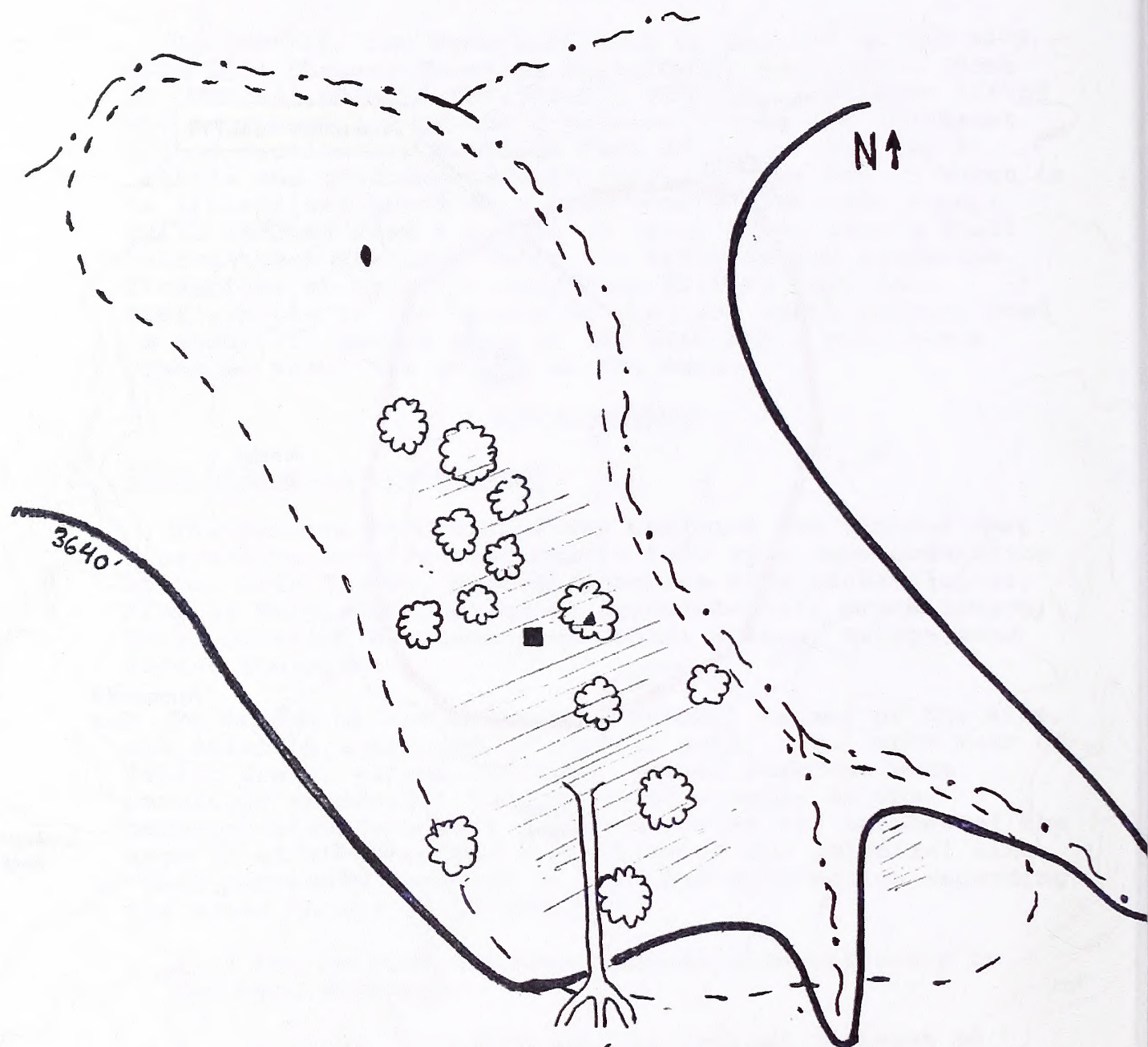


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The Buckskull Site

CA-HUM-718



- ▲ = DATUM (HEAVY NAIL DRIVEN INTO LARGE OAK)
- = TEST EXCAVATION (UNIT 1) 5-6 W 10-15 S OF DATUM
- = SURFACE (COLLECTED) CHERT WILLOW-LEAF POINT
- - - = SITE BOUNDARY
- /// = HIGH CONCENTRATION AREAS

APPROX. SCALE 1:1000

from Berg, 1982

MAP 4

uphill portion coupled with deposition on the downhill portion, has obscured the cultural deposit. Nonetheless, one would expect a higher frequency of cultural material than observed.

A prefield decision was made to avoid surface collecting; however, one chert projectile point (056-85-0) was collected from a shovel scrape because of its completeness and fine workmanship.

Based on the results of the surface examination, a single one-meter square excavation unit (See Map 4) was placed in the center of the dense northern sector, i.e., where surface frequency of tools or debitage exceeded five pieces per square meter. The unit was placed at five to six meters west and 0 to 1 meter south of a temporary datum, namely a large nail partially driven into a large oak tree. The purpose of excavating the unit was to determine the potential composition of the deposit in quantitative as well as qualitative terms. Since time was critical and the primary purpose was to verify the existence of a valuable deposit, field methods were adjusted appropriately.

Trowels and shovels were utilized to dislodge and transport respectively the samples into 1/4 inch mesh shaker screens. Due to the presence of abundant debitage and gravel, 1/8 inch mesh screens were considered impractical. Two 20cm levels, i.e., 0-20cm and 20-40cm, were excavated. Upon completion of these two levels and due to time constraints, the archaeological team agreed that sufficient data was obtained to evaluate the potential eligibility of the site in respect to criteria "d" of 36 CFR 60.4. It was noted that artifact yield dropped consistently during excavation; the team thought that although material remained below the 40cm level, further excavation would only reinforce rather than alter the collective field assessment.

ARTIFACT ANALYSIS METHODS

Debitage

Five pieces of obsidian chipping debris were recovered from Unit 1. Of these, three were from the 0-20cm level and two were from the 20-40cm level. One was an edge-modified flake. All obsidian specimens were submitted for trace element analysis (See Appendix A) and hydration analysis (See Appendix B). See Obsidian Sourcing and Hydration Discussion section for results of the analysis.

A total of 3,386 pieces of chert flaking debris was recovered from Unit 1 with 2,295 pieces from the 0-20cm level and 1,096 pieces from the 20-40cm level. See

Elizabeth Elstien's report below for analytical results.

CHERT DEBITAGE ANALYSIS

Buckskull (CA-HUM-718) Chert Debitage Analysis (by Elizabeth R. Elstien)

Introduction

This report presents data on the flaked stonedebitage recovered from a 1x1m test unit placed in an artifact-dense section of the Buckskull Site. The placement of this unit is described by Berg (1985). The single test unit at this large, prehistoric occupation yielded over 3,000 pieces of chertdebitage. The study of this site will provide an insight into the manufacturing strategies used by its ancient inhabitants.

Methodology

The test unit was excavated in two 20cm levels, with each level analyzed separately. As the levels were screened using only a one-quarter inch mesh, the retrieval of any small flakes is limited. All of the flakes analyzed were of Franciscan chert of various colors. It is important to note, though, that two obsidian pieces from each level were recovered, although they were not included in this analysis.

A one-quarter sample of the chert flakes from each level was selected for use in this analysis. To obtain this sample, a visual split was made of the pile of flakes from each level. The one-half pile from each level was then resplit. A count was later taken and the one-quarter samples from each level were found to be very close to the actual one-quarter amount. Alldebitage was then classified as to type, measured, and noted for potential heat treatment.

Debitage Categories

Alldebitage was assigned to adebitage category. The eleven categories used for this analysis are comparable to those used in the flaked stone analyses of two nearby sites, Cedar Flat (Jackson 1982) and Helena (Jensen and Farber 1982). Thedebitage categories as used here are defined below.

1. Primary decortication - a complete or nearly complete flake that exhibits cortex on all or almost all of its dorsal face (cortex = >90%).
2. Secondary decortication - a complete or nearly complete flake that exhibits cortex on part of its

dorsal face (cortex = <90%).

3. Cortical fragment - a fragment of a flake that does contain some degree of cortex, but because of its incomplete state, could not be accurately assigned to one of the cortical categories.

4. Shatter - a cube-like, blocky chunky of material that has no bulb of applied force and no cortex.

5. Linear - a non-cortical flake on which the length is twice the width and the lateral margins are parallel.

6. Stage one thinning flake - a large, tertiary, asymmetrical flake with one or two ridges on its dorsal face.

7. Stage two thinning flake - a tertiary flake that is more symmetrical than stage one flakes and has more ridges (>3) on its dorsal face; it is usually smaller than stage one flakes, but not always.

8. Stage three thinning flake - a tertiary flake "characterized by a faceted and lipped platform; the flake itself is markedly curved from the proximal to the distal end, and is often ascribed to the soft hammer technique" (Skinner and Gallagher 1974). It is also known as a classic bifacial thinning flake. For this analysis, any faceted and/or lipped platform tertiary flake was placed in this category.

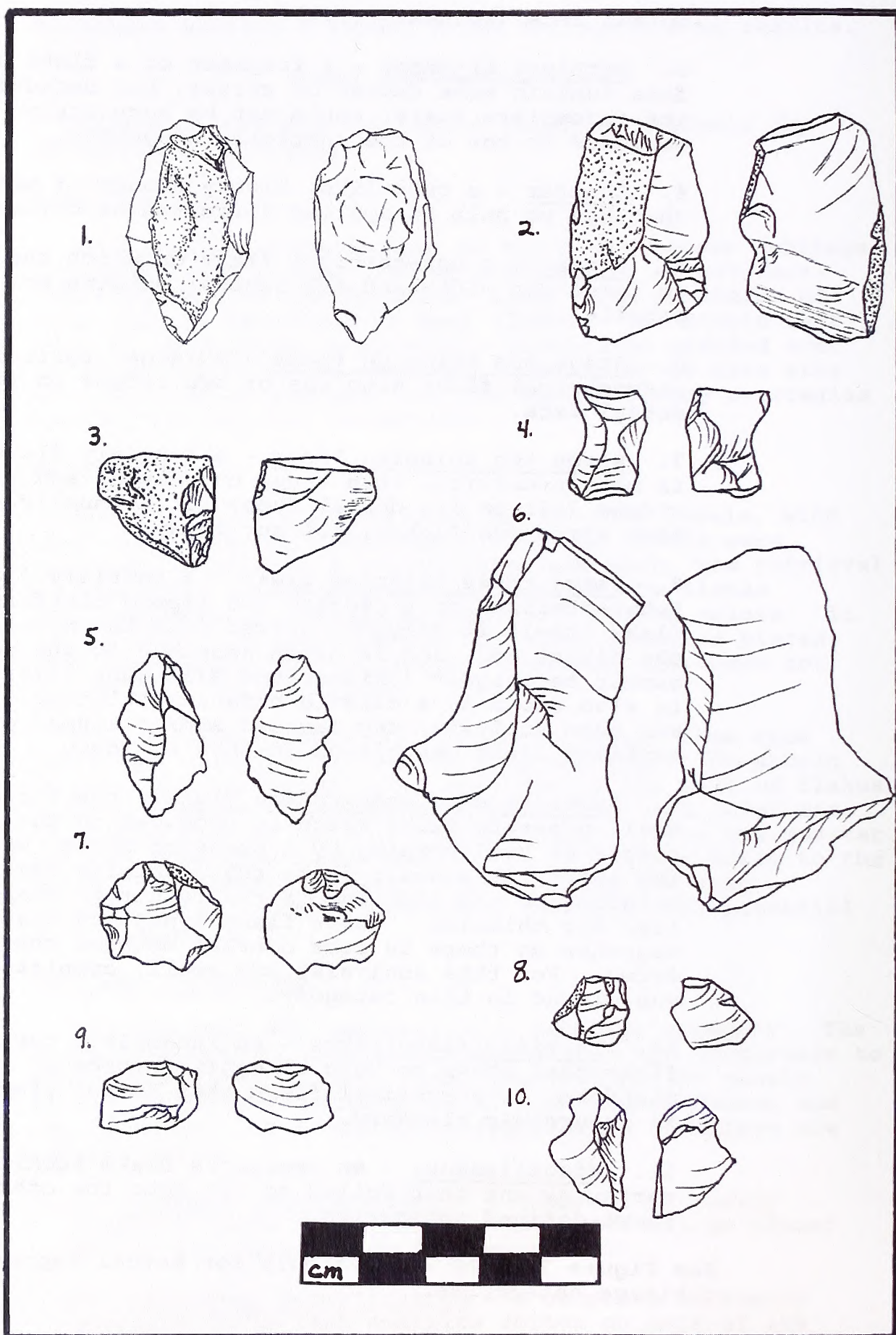
9. Pressure/edge preparation flake - the former is a small pressure flake which is produced in the final stages of tool shaping by a pressing force, whereas the latter is a small flake that exhibits some grinding on its edge and is the result of shaping the item for thinning. These flake types are classified together as there is some overlap between these forms. For this analysis, any small, complete flake was placed in this category.

10. Tertiary flake parts - an incomplete tertiary flake that shows no bulb of applied force or platform, or a proximal flake that is too fragmented to accurately classify.

11. Miscellaneous - an amorphous flake lacking cortex or one that failed to fit into the other above-defined categories.

See Figure 1, 1-10 respectively for actual representative debitage categories.

FIGURE 1. Debitage Categories



Measurements

Instead of precise measurements, the gross size of each flake was measured using graduated concentric circles (Figure 2) similar to Patterson's (1982) graduated squares. Beginning with a 20mm circle, each subsequent circle was increased in diameter by 20mm. A smaller circle, only 10mm in diameter, placed inside the 20mm circle delineate very small flakes. This allowed the gross size of all debitage, regardless of fragmentation, to be measured quickly.

Heat Treatment

The term heat treatment implies that intentional heating to improve the flaking quality of a raw material has occurred. Crabtree first noticed this phenomenon in lithic assemblages and, through experimentation, noted several characteristics of heat-treated materials. Observable characteristics include:

1. gloss or lustre on a flaked surface;
2. color change from the material's unheated state;
3. improved flaking qualities from the unheated state; and,
4. the presence of potlidding and crazing, which often are indicative of overheating a material (Crabtree and Butler 1964:2).

Crabtree and Butler (1964:2) noted that the surfaces of heated, but unmodified flakes do not exhibit any lustre; lustre can be detected only after the removal of a flake. In light of this, the presence of lustre within flake scars would indicate that heat treatment occurred before manufacture.

Jackson (1982) experimented with heat treating Franciscan cherts and his results provide the data necessary for the study of heat treatment in the Buckskull Site assemblage sample. For this analysis, only gloss, potlidding, and crazing were attributes used to determine if an item had been heated or not.

Gloss is the main heat treatment characteristic employed, as the flake or flake scars exhibit a waxy lustre, an easy attribute to determine. This posed a problem with the dark red and slatey colored cherts because gloss due to heat treating tends to be minimal in Franciscan cherts of these two colors (Jackson 1982). Therefore, all flakes exhibiting these colors were grouped together per level to determine which seemed to exhibit

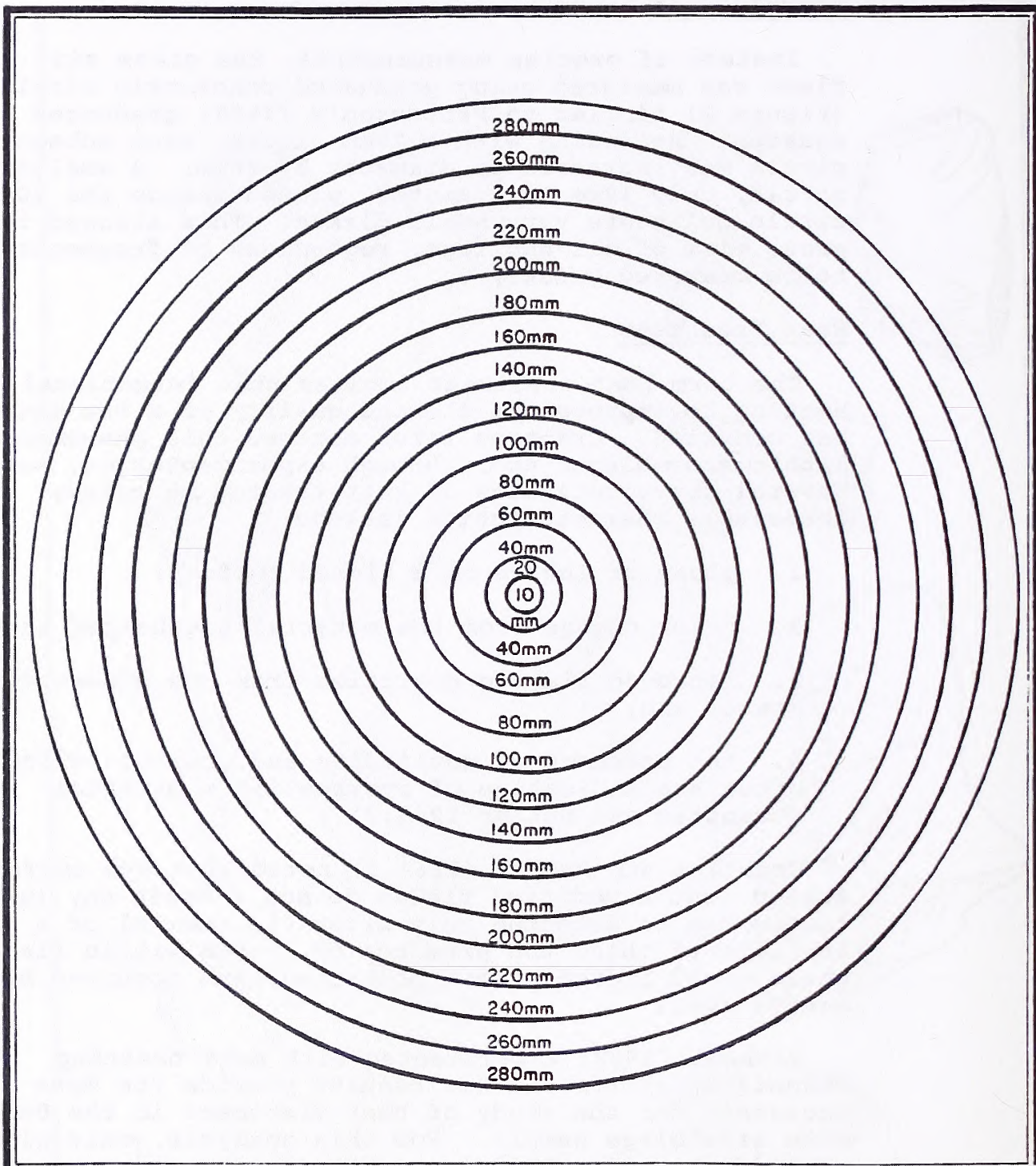


FIGURE 2. REDUCED VERSION OF CHART USED

TO MEASURE GROSS SIZE

gloss as compared to the others of that level and color. Admittedly, the method used to determine the existence of lustre of these two chert colors is not a thoroughly accurate one, as only items showing gloss on the higher end of the lustre scale will be noted as being heated. Nonetheless, this method will show if items displaying these colors were or were not heated.

Potlidding was another heat criterion that was easy to define. It was especially noticed in the dark red and slatey colored cherts, since gloss is not necessarily a reliable indication of heating with Franciscan cherts of these colors (Jackson 1982), as previously mentioned.

Assemblage Data

Tables 1 and 2 show that only 13.7% (n=69) of the 0-20cm level and 5.7% (n=17) of the 20-40cm level are cortical debitage. These low percentages suggest that a large portion of the initial decortication took place elsewhere on this site or off-site, perhaps at the source(s). The excavation of only two cores, one from each level, further supports the notion of initial decortication occurring elsewhere. If the prehistoric occupants of the Buckskull Site were performing initial decortication on site, one would expect to find more cores, especially when the high debitage frequency (over 3,000 pieces) is taken into account. As previously mentioned, though, it could simply be that decortication was performed in another location on site that differed from the placement of this test unit. However, this sampling problem seems unlikely based on surface finds and outcrop analyses.

Table 1. Debitage Frequencies/Percents

Unit 1: 0-20cm					
Debitage Description	Total Flakes		Heat Treated		
	#	%	#	%	
Primary decort.	6	1.2	6	100.0	
Secondary decort.	21	4.2	14	66.7	
Cortical frags.	42	8.3	33	78.6	
Stage 1 thinning	2	0.4	2	100.0	
Stage 2 thinning	5	1.0	4	80.0	
Stage 3 - BTF		9 1.8		6 66.7	
Pressure/edge prep.		15 3.0		13 86.7	
Linear	1	0.2	0	0.0	
Tertiary fl. parts		387 76.6		321 82.9	
Shatter	11	2.2	6	54.5	
Miscellaneous		6 1.2		6 100.0	
TOTAL	505	100.1	411	81.4	

Table 2. Debitage Frequencies/Percents

Unit 1: 20-40cm

Debitage Description	Total Flakes		Heat Treated	
	#	%	#	%
Primary decort.	2	0.7	2	100.0
Secondary decort.	3	1.0	1	33.3
Cortical frags.	12	4.0	8	66.7
Stage 1 thinning	4	1.3	4	100.0
Stage 2 thinning	7	2.4	7	100.0
Stage 3 - BFT		13 4.4	11	84.6
Pressure/edge prep.		17 5.7	9	52.9
Linear	1	0.3	0	0.0
Tertiary fl. parts		215 72.4	168	78.1
Shatter	8	2.7	5	62.5
Miscellaneous		15 5.0	14	93.3
TOTAL	297	99.9	229	77.1

The extremely large percents of tertiary flake fragments (over 70% per level), although not very informative in terms of manufacturing strategies, are interesting nonetheless. As bifacial thinning results in a high proportion of tertiary flake fragments (Rozen 1986), Bucksull's prehistoric inhabitants apparently concentrated their efforts on producing bifacial items. Based on the data presented in Tables 1 and 2, it appears that bifacial reduction and thinning occurred at this site due to:

1. the small size (Tables 3 and 4) and the thinness of most of the tertiary flake fragments;
2. the presence of classic bifacial thinning flakes, although comprising a small percent of each level; and,
3. the relative lack of initial reduction stages.

Table 3. Gross Chert Flake Sizes

Unit 1: 0-20cm					
Debitage Description	≤ 10mm	≤ 20mm	≤ 40mm	≤ 60mm	≤ 80mm
Primary decort.		1	5		
Secondary decort.	1	7	10	3	
Cortical frags.	1	24	17		
Stage 1 thinning			1		1
Stage 2 thinning		1	4		
Stage 3 - BTF		8	1		
Pressure/edge prep.	3	10	2		
Linear		1			
Tertiary fl. parts	20	311	56		
Shatter	1	9	1		
Miscellaneous		3	3		
TOTAL	26	375	100	3	1

Table 4. Gross Chert Flake Sizes

Unit 1: 20-40cm					
Debitage Description	≤ 10mm	≤ 20mm	≤ 40mm	≤ 60mm	≤ 80mm
Primary decort.			2		
Secondary decort.		1	1	1	
Cortical frags.	2	7	3		
Stage 1 thinning			3	1	
Stage 2 thinning		3	4		
Stage 3 - BTF	1	9	3		
Pressure/edge prep.	5	12			
Linear			1		
Tertiary fl. parts	10	177	28		
Shatter		5	3		
Miscellaneous	1	11	4		
TOTAL	18	225	52	2	

The retrieval of a number of formal chert tools, such as complete and fragmented bifaces (including projectile points), further supports the idea that bifacial thinning occurred on site.

Tables 1 and 2 also show that a large percent of thedebitage from both levels are heated (0-20cm level, 81.4%, n=411; and 20-40cm level, 77.1%, n=229). Tables 1 and 2 further indicate that heating occurred fairly early in the reduction process, as both cortical and tertiary flakes exhibit thermally altered attributes.

The slatey-colored Franciscan cherts were potlidded more than any other chert color. Generally, though, potlidding was not that frequent an occurrence and crazing was rarely observed on the debitage sample. The fact that materials have been heated before manufacture, along with the relative absence of potlidding and crazing, which both suggest overheating, indicate purposeful heat treatment. Unfortunately, the location of the heating process, whether on site or elsewhere, cannot be determined given the limited excavation.

In summary, Buckskull is the site of middle-to-later stages in the reduction sequence of various colored Franciscan cherts, with its inhabitants concentrating their efforts on producing highly formal tools. Buckskull's occupants were also concerned with the flaking qualities of these cherts, as they used chert materials that were heated rather early in the reduction sequence.

Cores

A single core was recovered from the 20-40cm level, see Figure 3. The core is of tabular green chert with cortex on the ventral and dorsal surfaces and is 105mm long, 77.5mm wide, and 37mm thick. This chert is very similar to or is the same as occurs at the nearby chert outcrop.

Modified Flakes

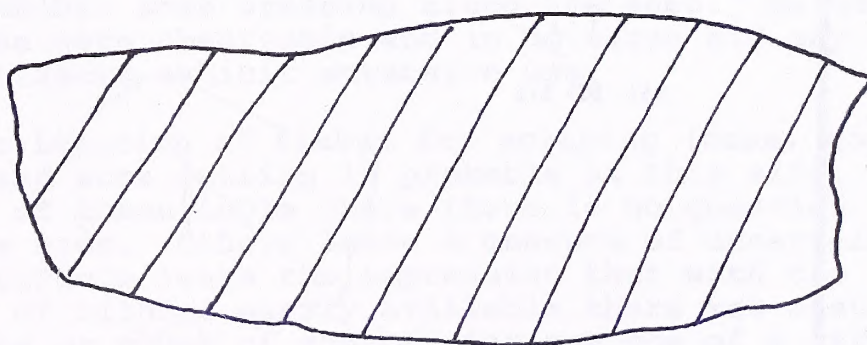
There are 24 chert flakes and one obsidian flake in the sample which exhibit edge modification suggesting use. Such modification generally consists of one or more flake edges with continuous, regular micro-chipping. Crushing is sometimes present. The edge flaking is not invasive and, with only a few exceptions, does not appear to represent purposive pressure flaking.

The identification of "utilized" flakes in a sample of thousands of flakes can rightly be questioned. One must consider the extensive past human and animal activities and geologic processes (freeze-thaw, colluvial movement, etc.) as well as the reduction operations themselves. Verification can be aided to some extent by macroscopic and microscopic edge wear analysis. Experimentation also can be of assistance. Furthermore, a review of the proposed artifacts by a number of experts in flaked stone analysis can help the process. These procedures were followed, although no experimentation was undertaken specifically for this collection. It was clear during the sorting process that a quantity of flakes exhibit moderate edge damage that was not regularized along any edge. These items were not included in this category. What flake artifacts remained from the sorting procedure are discussed here. Several kinds are illustrated in Figure 4.

FIGURE 3. Tabular Chert Core



056-85-1077



MLAZ '90

FIGURE 4. Edge Modified Flakes



056-85-201



056-85-311



056-85-342



056-85-329



056-85-307



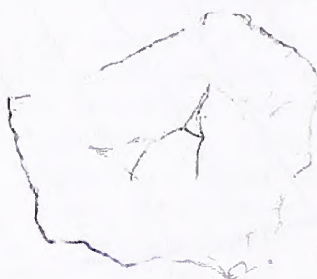
056-85-327



056-85-312



056-85-313



056-85-325



Within the test unit, 17 of these tools were found in the first level (Table 5) and eight in the second level (Table 6). The edge modified flakes range from 13.4 to 59.5mm in length with a mean of 31.4mm (SD=11.5). Widths vary from 8.5 to 50.3mm with a mean of 23.5 (SD=8.9), and thicknesses are between 2.2 and 15.2mm with a mean of 7.7mm (SD=2.8). The spine plane angles range from 20 to 55 degrees (mean of 38.5 degrees and SD=7.9) with the actual edge angles varying between 25 and 65 degrees. The mean is 45.4 degrees with a standard deviation of 12.1 degrees. The differences in edge angle demonstrate that many of the used edges were used in high angle activities, as in a pulling/scraping function more than cutting.

The edges of the tools are mostly unifacial and unilateral (15 examples) with six that are unifacial/bilateral and two unifacial/multilateral. Only two tools are bifacial, both being bilaterally used. The actual utilized edges are for the most part straight (8) or ovate/excurvate (8), with three examples irregular, three showing multiple edge shapes, and three beaked.

Flake types utilized are quite variable reflecting the debitage variability. Most of the tools are from Stage 2 thinning flakes (10) or are non-diagnostic tertiary flake parts (8). There are two examples each of Stage 3 thinning flakes, shatter, and secondary decortication flakes. A single example of a linear or blade flake was used.

A Bausch and Lomb variable microscope and hand lens (10 to 100X) were used to examine the edges of these tools. In only three cases was probable dulling noticed. Forty per cent of the artifacts (including two of the three above) exhibit some crushing along the edge. No definite striations were observable and in no cases did any of these artifacts exhibit extensive use.

The utilization of flakes for scraping (bone, wood?), graving and some cutting is probable at this site. There are some of these tools where there is no question that they were used. Others leave a measure of uncertainty. These artifacts leave the impression that with the abundance of lithics easily available there was casual use of a flake or chunk of shatter for any one of a variety of small-scale scraping, engraving and cutting activities. Such singular use was followed by discard. Such tools also imply that enterprises other than quarry/workshop tasks were occurring at the site.

T A B L E 5.

CHERT MODIFIED FLAKES

Unit 1; 0-20cm

(Measurements in mm)

Catalog Number	Length	Width	Thick.	Spine/ Flake Angle	Edge Angle	Flake Type	Edge Type	Wear
056-58-								
302	25.4	22.8	6.2	45	45	Stage 2	unif - irreg straight - ovate, unilat	Slight crushing
306	25.2	19.8	5.5	40	60	Non-diag. Tertiary	unif - irreg ovate - unilat	None
307	59.5	41.8	10.8	30	45	Secondary Decort	unif - irreg ovate - unilat	None
311	38.3	16.4	5.5	55	55	Linear	bilat - unif irreg - str	Crushing dulling
312	35.9	27.3	11.5	45	45	Shatter	unif - unilat reg - ovate	Some crushing
313	50.0	28.6	6.1	30	60	Stage 2	bilat - unif reg - straight	One stri minute crushing "rub" m
320	29.1	19.2	6.7	45	60	Non-diag. Tertiary	unif - reg str - unilat	None
322	21.0	18.8	6.2	35	35	Stage 3	bif - irreg bilat - str	None
325	39.1	32.4	11.3	45	60	Stage 2	unif - reg multi-lateral irreg - ovate	Minute crushing "evasive flakes
326	36.5	23.4	8.2	35	35	Secondary Decort	bilat - unif irreg	None
327	27.2	21.4	8.0	30	30	Stage 3	bif - irreg bilat - str	None
328	25.4	19.1	5.7	30	25	Stage 2	unif - beaked	None
329	21.2	19.5	9.5	40	55	Shatter	unif - reg ovate - unilat	Broken, little crushing
330	19.3	14.4	7.6	35	35	Non-diag. Tertiary	unif - reg ovate - unilat	crushing
331	22.8	19.2	4.8	45	45	Stage 2	unif - irreg ovate - unilat	None

bif - bifacial
bilat - bilateral
reg - regular
str - straight

unif - unifacial
unilat - unilateral
irreg - irregular
stria - striation

T A B L E 6.

CHERT MODIFIED FLAKES

Unit 1; 20-40cm

(Measurements in mm)

atalog umber	Length	Width	Thick.	Spine/ Flake Angle	Edge Angle	Flake Type	Edge Type	Wear
56-58-								
32	57.5	50.3	15.2	45	50	Stage 2	unif - reg unil - str	None
33	29.3	25.0	7.9	35	35	Non-diag Tertiary	unif - reg unil - ovate	Possible dulling
34	33.2	19.1	6.9	45	65	Non-diag Tertiary	unif - reg unil - str	None
35	28.3	22.2	10.5	45	45	Stage 2	unif (but opposite sides) - irreg bilat - ovate	None
36	24.2	22.3	4.5	30	30	Non-diag Tertiary	unif - reg bilat - irreg	None
37	23.5	17.1	8.7	45	50	Non-diag Tertiary	unif - reg unilat - irreg	Crushing
41	13.4	8.5	2.2	20	30	Non-diag Tertiary	unif - reg unil - str	None
42	29.5	22.7	5.7	40	60	Stage 2	unif - reg multi-lateral - beaked - dential	a little crushing

if	-	bifacial	unif	-	unifacial
ilat	-	bilateral	unilat	-	unilateral
eg	-	regular	irreg	-	irregular
cr	-	straight	stria	-	striation

Bifaces

Twenty-four bifaces or portions of bifaces were recovered, 18 from the 0-20cm level and six from the 20-40cm level. Bifaces were examined in terms of a reduction strategy, beginning with crude rough-outs and finishing with refined projectile points. However, projectile points are dealt with in a separate section. No significant differences were observable between the two excavation levels in terms of stages of bifaces (non-projectile points) present. See Tables 7 and 8.

Bifaces are divided into five stages (Stage 5 and some of Stage 4 being projectile points) following the works of various authors (cf. Muto 1971; Pippin and Hattori 1979; Basgall et al. 1986; Kelly et al. 1987). Bifaces include artifacts that exhibit opposing percussion and/or pressure flaking along the artifact's margins, as well as indications of formal shaping and thinning, usually in an elongated oval shape. See Figure 5 for examples. The biface types are defined on the basis of degree of remnant cortex, thickness, degree of edge sinuation, degree of outline symmetry, extent of percussion flaking relative to width of the artifact, and presence of pressure retouch.

Stage 1 bifaces have a very thick cross-section, percussion flake removal scars and margins that are markedly sinuous. They are generally known as rough-outs. No Stage 1 bifaces were recovered at the Buckskull Site.

Stage 2 bifaces have percussion flake removal scars which do not reach the mid-section of the artifact, a less sinuous edge, a slightly thinner cross-section than Stage 1 bifaces, and only rough shaping. These are sometimes labeled preforms. Ten of the 24 bifaces fall into this category. All of these bifaces are broken, with three ends and seven lateral or unidentified margin pieces.

Thicknesses on these specimens ranges from 5.5mm to 18.3mm with a mean of 10.9mm (SD=3.7mm). Widths range from about 32mm to 49.5mm with a mean on measurable specimens of 45.5mm (SD=5.7mm). While no whole examples were recovered, an estimate from partial specimens suggests a length of about 8-10cm for at least some of the specimens. The edge angles on the stage 2 bifaces vary from 20 to 50 degrees with a mean of 40.5 degrees (SD=10.7 degrees). There is evidence of heat treatment on some of these biface fragments.

Stage 3 bifaces differ from the earlier stage bifaces by regular margins with flake scars generally crossing the mid-section. These are percussion thinned bifaces exhibiting no pressure flaking. These are also commonly designated preforms or blanks. There are three complete

T A B L E 7.

CHERT BIFACES

Unit 1; 0-20cm
(Measurements in mm)

<u>Catalog Number</u>	<u>Length*</u>	<u>Width</u>	<u>Thick.</u>	<u>Weight</u>	<u>Edge Angle</u>	<u>Mfg. Stage</u>	<u>Portion</u>
056-85-100	-	41.5	18.3	-	45	2	Proximal end
056-85-101	-	-	8.6	-	30	3	Proximal end
056-85-102	-	-	11.8	-	45	2	Lateral margin
056-85-103	-	-	5.5	-	30	3	Proximal end
056-85-104	-	-	9.3	-	20	2	Lateral margin
056-85-105	-	-	10.1	-	50	2	Lateral margin
056-85-106	-	33.1	6.7	-	25	3	Medial
056-85-107	-	-	7.6	-	40	2	Indeterminate margin
056-85-108	-	-	-	-	25	3 or 4	Distal end
056-85-109	-	-	-	-	30	3	Indeterminate margin
056-85-110	-	-	-	-	25	3	Lateral margin
056-85-111	-	-	-	-	25	3	Indeterminate margin
056-85-112	-	-	-	-	30	3	End
056-85-114	-	-	5.5	-	35	2	Indeterminate margin
056-85-115	42.5+	31.0+	11.1	-	50	2	Proximal end
056-85-116	51.2	31.4	13.3	21.2gm	45	made on Nearly complete a flake (Stage 3 equivalent)	
056-85-125	43.8	31.2	9.6	14.65	35	3	Complete
056-85-126	28.8	19.2	5.2	3.0	35	3	Complete (reject)

Unit 1; 20-40cm

056-85-117	8-10cm	49.5	14.4	-	25	2	Proximal end
056-85-118	9-10cm	45.0	10.3	-	25	3	Proximal end
056-85-120	-	-	13.0	-	45	2	Indeterminate edge
056-85-121	-	35.2	8.0	-	35	3	Medial
056-85-122	-	-	-	-	50	2	Indeterminate edge
056-85-124	-	-	-	-	35	3	End

* Only complete measurements are provided.

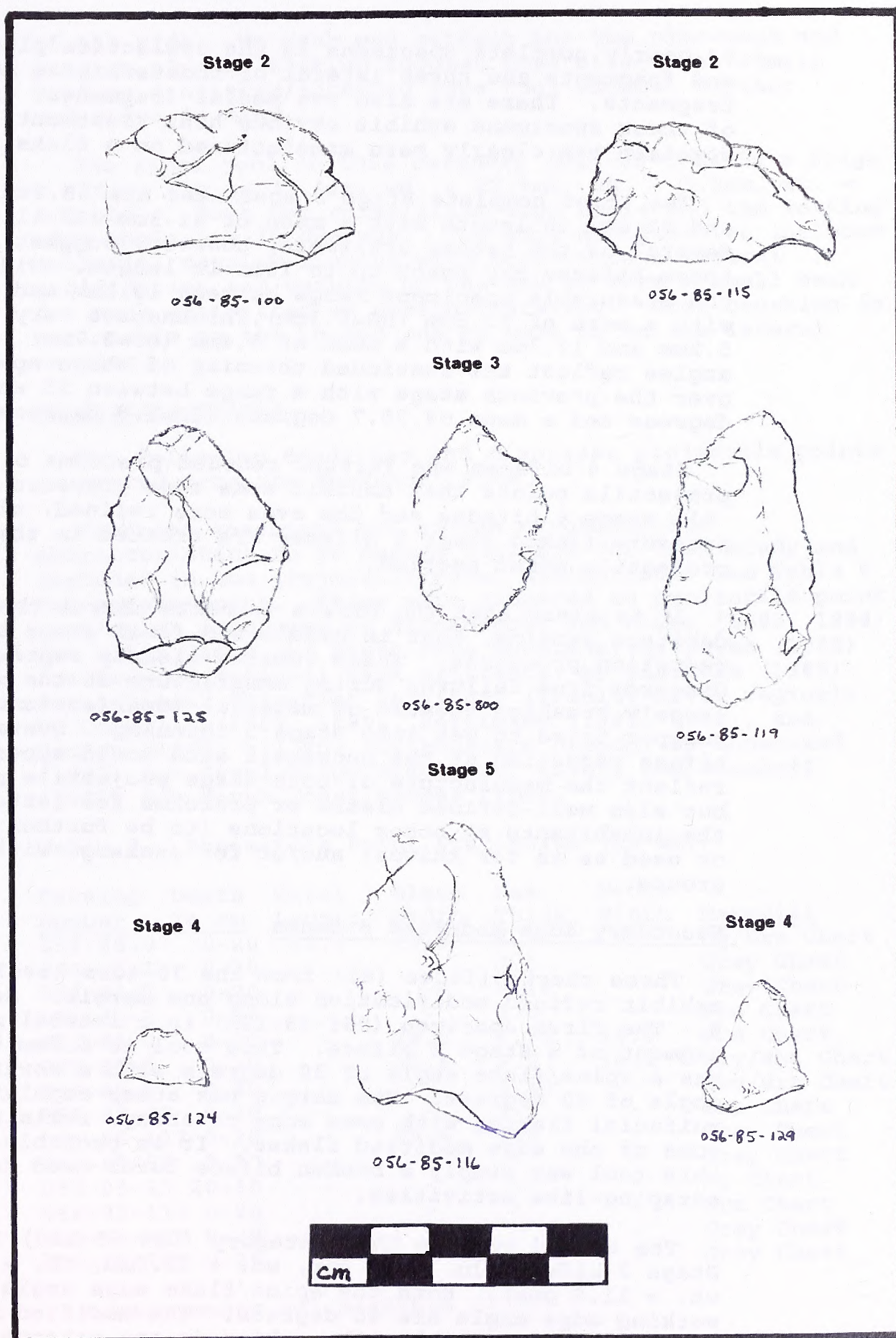
T A B L E 8.

CHERT EDGE-MODIFIED BIFACES

Unit 1; 20-40cm
(Measurements in mm)

Catalog Number	Length	Width	Thick	Weight in gms	Spine/ Flake Angle	Edge Angle	Tool Type	Comments	Wear
056-85-119	51.3	25.5	8.1	11.8	40	40	Stage 3 biface with edge mod.	Unif, reg unil, concave	None
123	-	-	6.7	-	30	60	Stage 2 biface with edge mod.	Unif, reg unil, irreg	Edge crushin
800	37.4	22.8	5.8	5.5	30	60	Stage 3 biface with edge mod.	Unif, reg multi-lat beaked and concave	Crushin around s and edg

FIGURE 5. Bifaces



or nearly complete specimens in the collection plus six end fragments and three lateral or indeterminate margin fragments. There are also two medial fragments. Several of these specimens exhibit obvious heat treatment. One specimen has clearly been manufactured on a flake.

The three complete Stage 3 specimens are 28.8mm, 43.8mm and 51.2mm in length with a mean of 41.3mm (SD=11.4mm). Several of the broken artifacts, however, suggest some of these bifaces may reach up to 10cm in length. Widths on the measurable specimens range between 19.2mm and 45.0mm with a mean of 32.5mm (SD=8.3mm). Thicknesses vary between 5.2mm and 13.3mm with a mean of 8.4mm (SD=2.7mm). Edge angles reflect the continued thinning of these specimens over the previous stage with a range between 25 and 45 degrees and a mean of 30.7 degrees (SD=5.8 degrees).

Stage 4 bifaces are further reduced preforms or even projectile points that exhibit some edge pressure flaking. All stage 4 bifaces and the even more refined, all pressure-flaked Stage 5 bifaces are treated in the projectile point section.

It is clear that the biface remnants mirror the debitage remains, that is middle and final stage biface reduction processes. These remains clearly represent discards from failures during manufacture at the site, largely breakage because of material imperfections as the knapper tried to get into Stage 3 thinning. Overall, biface reduction at the Buckskull site would appear to reflect the manufacture of both large projectile points but also well-refined blanks or preforms for latter use by the inhabitants at other locations (to be further reduced or used as is for knives) and/or for exchange with other groups.

Secondary Edge Modified Bifaces

Three chert bifaces (all from the 20-40cm level) exhibit refined modification along one margin. See Table 8. The first specimen (056-85-123) is a lateral margin segment of a Stage 2 biface. This tool is 6.7mm thick, has a spine/flake angle of 30 degrees with a working edge angle of 60 degrees. The margin has steep regular unifacial flaking with some edge crushing, reminiscent of some of the edge modified flakes. It is probable that this tool was simply a broken biface later used for scraping-like activities.

The second tool in this category (056-85-119) is a Stage 3 biface (ln. = 51.3mm, wd. = 25.5mm, th. = 8.1mm, wt. = 11.8 gms). Both the spine/flake edge angle and the working edge angle are 40 degrees. The modified margin is regular and unifacial with working on one concave segment

of the side. No wear was evident but the placement and pattern of edge flaking suggest this biface was simply used as a cutting/scraping type tool without further reduction in mind.

The final tool in this category (056-85-800) is a Stage 3 biface (ln. = 37.4mm, wd. = 22.8mm, th. = 5.8mm, wt. = 5.5 gms). Both the spine/flake edge angle and the working edge angle are 30 degrees. The edge modification includes unifacial regular flaking with both concave lateral modification and working on the end to form a small beak for such activities as possibly graving. Some crushing is noticeable on the beaked end as well as on the lateral margins.

Projectile Points

The following describes and discusses projectile points recovered from the Bucksull Site.

Fourteen specimens had enough morphological characteristics to be deemed feasible for this study and included in the projectile point definition. See Table 9 for measurements. These were compared to projectile point typologies developed by Hildebrandt and Hayes (1983, 1984) for Pilot Ridge and South Fork Mountain; by Hayes (1985) for Redwood National Park artifacts; by Eidsness (1985) for adjacent Chimariko territory (Trinity River region); by Connolly (1988, 1989), Pettigrew (1988, 1989), and Hannon (1989) all for southwestern Oregon; by Huberland (1988) for Etsel Ridge/Middle Eel River; and Baumhoff (1982) for North Coast Ranges types.

Table 9. Projectile Point Statistics (in mm.)

Catalog Number	Depth In cm	Total Length	Blade Width	Max. Thick	Neck Width	Material
056-85-0	0-20	39.5	19.5	6.0	-	Bg/Brn Chert
056-85-1	0-20	-	-	7.0	-	Grey Chert
056-85-2	0-20	-	-	6.25	-	Grey Chert
056-85-3	0-20	-	-	3.0	-	Brn Chert
056-85-4	0-20	-	28.5	7.75	18.0	Brn Chert
056-85-5	0-20	-	30.5	9.0	18.0	Gry/Wht Chert
056-85-6	0-20	-	-	5.25	-	Brn/Grn Chert
056-85-82	0-20	-	-	3.5	-	Brn Chert
056-85-127	0-20	-	19.6	7.5	-	Grey Chert
056-85-58	0-20	-	-	-	-	Grey Chert
056-85-83	20-40	-	-	-	-	Bg Chert
056-85-112	0-20	-	-	-	-	Brn Chert
056-85-128	0-20	-	-	-	-	Grey Chert
056-85-129	0-20	-	-	-	-	Grey Chert

- measurements not possible

Results of the projectile point analysis are as follows:

One point, see Figure 6, is leaf shaped or lanceolate and is statistically similar to Hildebrandt and Hayes (1983:4.18) Group XXV, Eidsness' (1985:271) Group 25. This specimen is somewhat bi-pointed although the base is somewhat wider and more rounded than the distal portion. The entire margin has been finely pressure flaked. It is undecided as to what period these best fit for the Pilot Ridge/South Fork Mountain area.

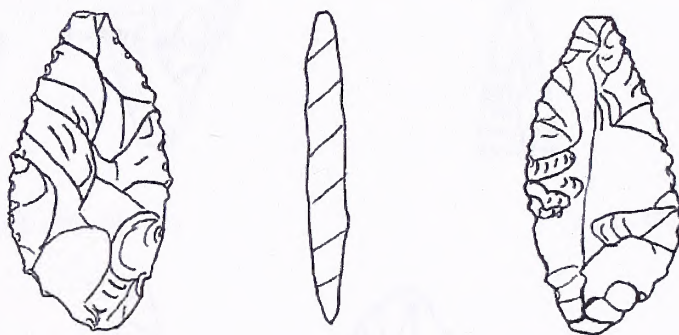
Four point fragments, see Figure 7 and 8e and 8f, have serrations and are similar to Hildebrandt and Hayes (1983:4.17) Group XXIV. These unique bifacially worked types are generally bi-pointed with varying lengths. Serrations tend to begin very near the proximal end with a number being well-defined and extending out as much as 4-5mm on both sides with variable spacing from close to wide. These (ibid:4.20) are typed as the Oregon Series and are a Middle Period marker.

Three projectile point fragments, see Figure 9, fit Hildebrandt and Hayes (1983:4.19) Group XXVII, small leaf shape or lanceolate with subtle denticulated margins. Often made on curved flakes, these are generally worked on the dorsal side and left flat and unworked on the ventral surface creating a plano-convex cross section which varies from triangular to rounded on dorsal side. The margins are usually completely pressure flaked on the dorsal surface. Any working on the ventral surface is to accomplish a flatter surface or sharper point. Typed as McKee Uniface Series, these point types are proposed as Middle Period markers.

Two large side/corner-notched stemmed projectile point fragments, see Figure 10, were recovered. The most complete specimen has a very long incurvate blade with downturned shoulders. These points have been pressure flaked along the margins. The stem type cannot be determined on these due to their fragmented nature. Given the size and workmanship, it is tempting to place them in Hildebrandt and Hayes (1983:4.8) Group XI Mendocino Series which is postulated to be a Middle Period marker for the area.

One projectile point fragment, see Figure 8a, is problematic given its triangular shape, extreme thinness, and fine workmanship. Dorsal and ventral surfaces and margins have been finely pressure flaked. Possibilities are that it could be an unfinished projectile point, a harpoon insert as found along coastal sites, or an inset for a small knife. There is no wear and it was probably never used.

FIGURE 6.



056-85-0

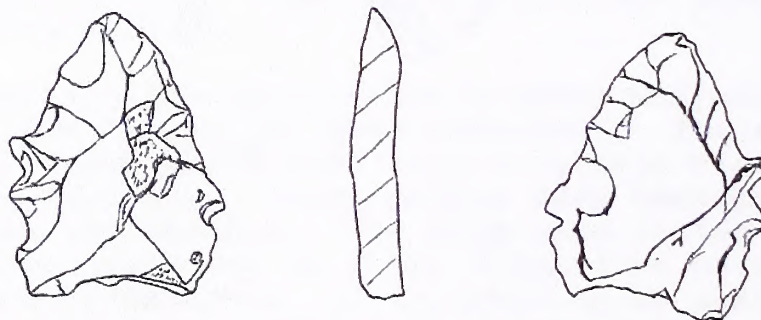


MJD '90

FIGURE 7.



056-85-1



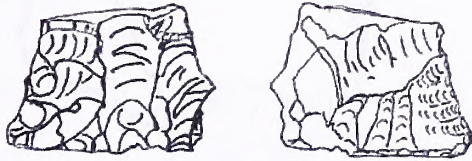
056-85-2



M.H.H. '90

FIGURE 8.

a.



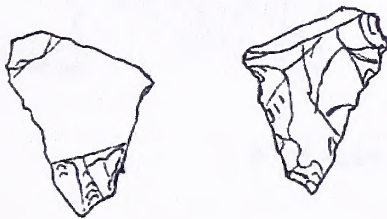
056-85-82

b.



056-18-58

c.



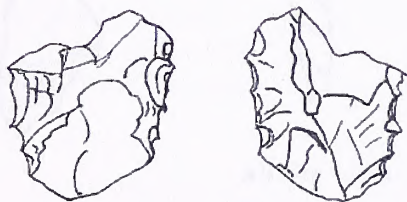
056-85-129

d.



056-85-83

e.



056-85-127

f.

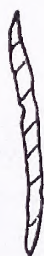


056-85-128



mjh 90

FIGURE 9.



056-85-3



056-85-6

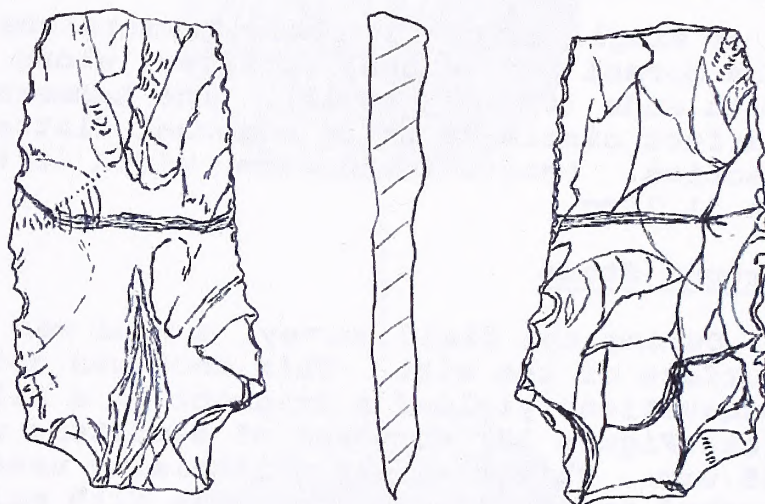


056-85-112



7m848 '90

FIGURE 10.



056-85-5



056-85-4



MENG '90

Three miscellaneous projectile point fragments, see Figure 8b, 8c, and 8d, cannot be typed or placed as Period markers. The presence of a notch on 8b suggests a corner-notched projectile point. 8c is a suspected tapering stem of a projectile point and is a Stage 4 biface from the 0-20cm level. 8d is a pressure flaked projectile point tip of unknown type from the 20-40cm level.

Battered Stone

A single granitic cobble hammerstone has battering on the dorsal and ventral surfaces, along one margin, and at both ends (see Figure 11). The hammerstone is not a perfect circle as it is somewhat flattened in cross section. Length is 50.25mm, width is 43mm, and thickness is 31.75mm.

Ground Stone

During the field survey, a mano was recorded on the surface of the site. This tool was not collected. The excavations yielded a fragment of a milling/grinding slab (see Figure 12) composed of sandstone with a thickness of 35.0mm. This slab was unifacially used and exhibits a pecked and abraded center area with multiple fine parallel striations. Other areas of the surface, toward the outer edges, exhibit polishing where there are higher protuberances. This tool fragment is no doubt the remnant of a milling slab. However, the abraded center offers some interesting possibilities. The abrading could have been preparation of the surface for greater grinding efficiency. There is also the possibility that the fine parallel striations represent the result of edge grinding of chert artifact platforms prior to further reduction of that item. The problem with this latter idea is that there is no evidence in the sample of edge grinding in the reduction process. In any case, the presence of grinding tools at this site implies that this site was at least a base camp at one interlude for a multitude of group activities, although there was considerable emphasis on biface reduction.

Obsidian Sourcing and Hydration Discussion

The five obsidian samples sourced and hydrated are insufficient for deriving any far-reaching conclusions regarding both the age of the site and trade/exchange networks. However, the results do provide some preliminary insights.

Sourcing analysis (see Appendix A, Table 1), shows obsidian was acquired from eastern sources only. In terms of exchange, it is apparent that the obsidian acquisition

FIGURE 11.

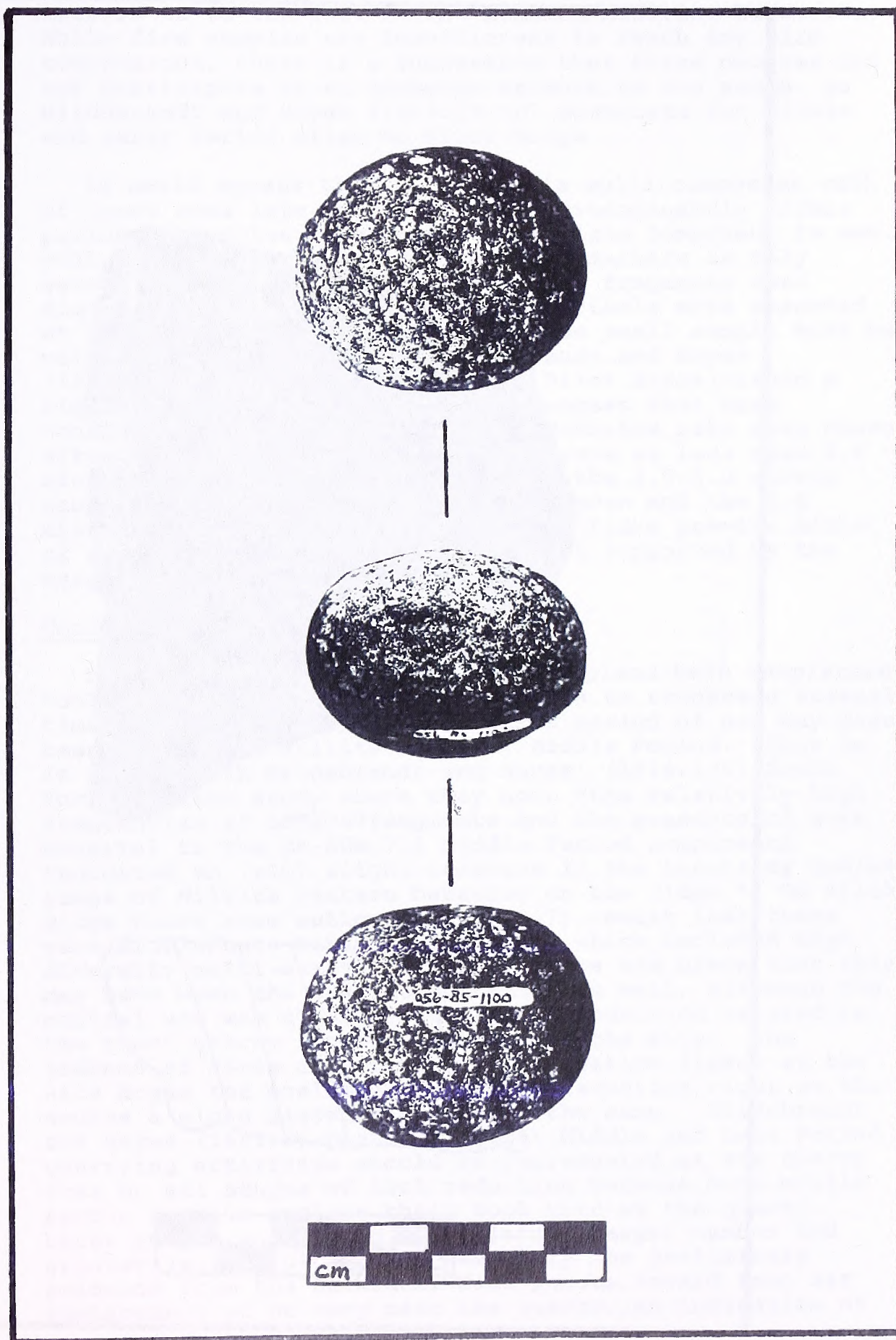
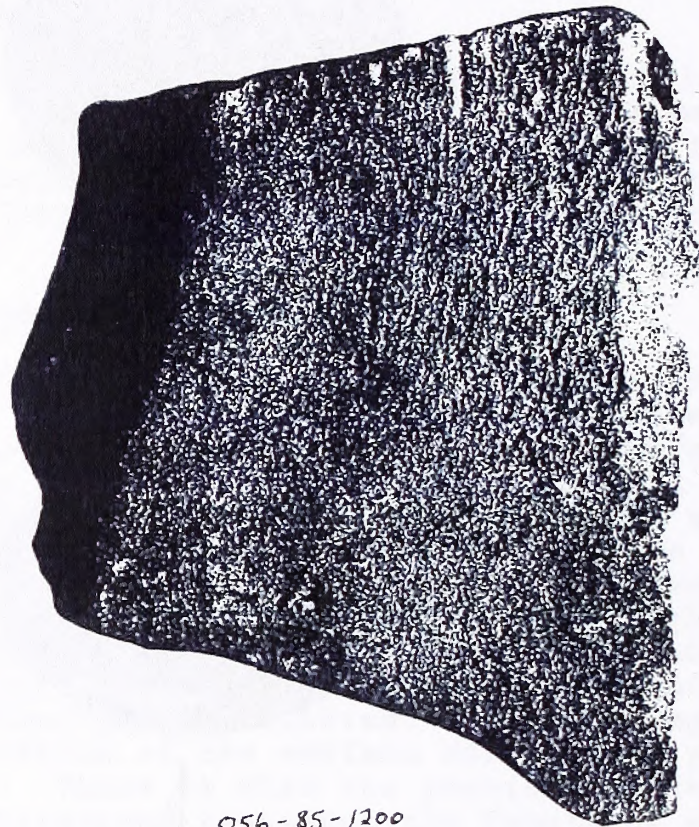
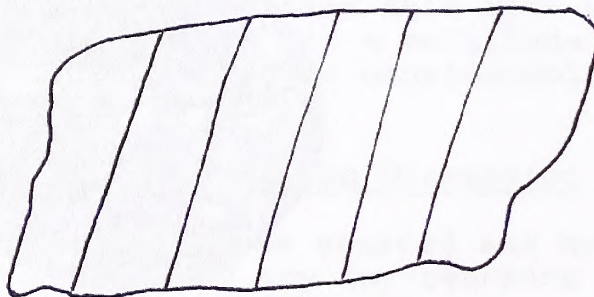


FIGURE 12.



056-85-1200



network is to the east in the Redding/Medicine Lake area. While five samples are insufficient to reach any firm conclusions, there is a suggestion that these peoples did not participate in an exchange network to the south, as Hildebrandt and Hayes (1983:19.10) postulate for Middle and Early Period sites on Pilot Ridge.

It would appear that this site is multi-component with at least some late prehistoric but predominantly middle period activities represented. The late component is not well-represented by artifactual time markers as only several small broken projectile point fragments were discovered and no late milling stone tools were observed at the site. However, once again the small sample must be weighed (see Appendix B). Hildebrandt and Hayes (1983:19.8), in a study on nearby Pilot Ridge within a similar environmental situation, suggest that when considering the obsidian from the Medicine Lake area those sites of the later period would hydrate at less than 2.0 microns with Middle Period sites in the 2.0-3.2 micron range. The 4.0 micron reading on Tuscan and the 3.4 micron reading on a Grasshopper Flat flake provide hints of even earlier use, a contention not supported by the meager sample of artifacts.

Conclusions

The Buckskull Site represents an upland base camp/stone tool processing location that appears to transcend several time periods, although the dominant period of use may have been during the Willits Pattern, Middle Period. This is in accord with Hildebrandt and Hayes' (1984:101) South Fork Mountain study where they note "the relatively high frequencies of biface fragments and the presence of core material in the CA-HUM-734 Middle Period components indicated an (sic) slight increase in the intensity and/or range of Willits Pattern behavior on the ridge." On Pilot Ridge these same authors (1983:19.7) remark that there were Middle/Late Period assemblages which included high diversity multi-activity areas. There are hints that this may have been the case at Buckskull as well, although the central use was clearly stone tool production related to the chert quarry located uphill from the site. The absence of cores and primary decortication flakes at the site argue for preliminary Stage 1 reduction right at the source a close distance away from the camp. Hildebrandt and Hayes (1984:8) postulated that Middle and Late Period quarrying activities should be represented at the quarry area by all stages of tool reduction because more mobile people tend to replace their tool kits at the quarry. Later people would need to replace a larger number and greater variety of tools. Certainly the preliminary evidence from the Buckskull Site points toward tool kit replacement at or very near the quarry, an indication of

Middle and probably Late Period use if this model is correct.

In further examining the Hildebrandt/Hayes (1983:19.11) land use model, it is useful to examine the Buckskull Site and surrounding sites for a measure of fit. If we are correct in our age assignment for the main site, then for Middle-Late times we would expect to see evidence of a collecting strategy with semi-sedentary villages near oak groves and anadromous fish runs, as one might expect along the nearby Van Duzen River. Riverine sites are known for this area, but their age and contents are not.

In carrying the model further, there would be a lack of multi-activity areas in upland locations (also see Hildebrandt and Hayes 1984:7), with only short term task specific activities carried out there, unless these happen to be lower elevation ridges where the effects of the neoglacial climatic change would be less. How does the Buckskull site measure up? In the first place, there is no doubt that task specific activities (quarrying related) were being undertaken. But the size, depth and complexity of the deposit, the presence of milling stones and projectile points, small cutting/scraping tools, and exotic obsidian items suggest that the Buckskull Site was more than single task oriented. We believe that this site location was also an important hunting area with incidental plant collecting/processing. Such activities were probably seasonal, during the summer and early fall, with movement back to the lowlands during the cold months.

It is interesting to note that Sundahl (1987:50-51), in her work at Cable Creek on South Fork Mountain, hypothesizes that Middle Period sites can be divided into an earlier and later phase with the earlier phase characterized by a shift to lower elevations and an initiation of riverine exploitation. Diagnostic artifacts include the large and medium-sized corner-notched points and possibly the McKee unifaces. The later phase of the Middle Period includes the introduction of the bow and arrow, increased population, intrusion of a new group (vis-a-vis Athabascans), introduction of Trinity Series points, and minimal use of grasshopper Flat obsidian. This hypothesis may apply to the Buckskull situation insofar as we can interpret the minimal data.

Recent work by Sundahl (1988:96) at Cox Bar on the Trinity River found that a Borax Lake Pattern existed in that area with utilization of both high elevation ridge tops and low-elevation river terraces by small mobile groups. Such use, with permutations, appears to have persisted in the Buckskull area implying a continuity of tradition over a long period of time, possibly a reflection of long-standing Hokan speakers living in the

vicinity until the recent arrival of Athabascan speakers. Upon their arrival there may have been a decrease in mobility with village/camp size increased due to greater use of the fisheries and other resource intensification and increased storage. Use of the upland quarry/hunting area, however, no doubt persisted but at a lower level of use.

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APPENDIX A

SOURCE DETERMINATION OF ARCHAEOLOGICAL OBSIDIAN SPECIMENS CA-HUM-718

METHOD

The trace element analysis of the obsidian specimens listed in the accompanying table was conducted at the Department of Geology, University of California, Davis. This work was performed on a Kevex 0700 energy dispersive X-ray fluorescence unit, using a rhodium (Rh) tube with a 0.05 mm rhodium filter at 30 kilovolts and 0.05 milliamps to analyze for rubidium (Rb), strontium (Sr), yttrium (Y), zirconium (Zr), niobium (Nb), lead (Pb), and thorium (Th). (Only Rb, Sr, and Zr are reported here because those are the only three elements used to differentiate obsidian sources in most parts of California). A germanium (Ge) target at 17 kilovolts and 1.7 milliamps was used to analyze for manganese (Mn) and iron (Fe). This unit has a Si(Li) detector and is used in conjunction with a Kevex 8000 multichannel analytical spectrometer.

Normally in controlled geological studies, a rock is crushed into a powder and pressed into a pellet. That prepared sample has a homogenous distribution of constituent elements and is perfectly flat, providing the appropriate geometry for consistent and systematic results. Archaeological materials cannot be treated in this manner, so their elemental distribution (glasses are assumed to possess homogeneous elemental distributions) and imperfect geometry (i.e., their lack of a perfectly flat surface) must be compensated through a form of "ratio" analysis.

In this procedure, samples were run for 200 live-seconds, and the resulting spectra were stripped of their backgrounds. Integrated intensities were calculated for each of the elements in each sample, and those intensities were divided by the integral of the Compton peak. In conjunction with this work, geological rock standards with known quantities of constituent elements were similarly analyzed. The rock standard ratios were used to calculate a regression formula, and the sample ratios were used to derive the parts per million values for each specimen. Due to the very small size of several of the archaeological specimens, however, the ppm values are not accurate with respect to source characterizations. Those figures can be used to derive ratios, on the other hand, reflecting the relative quantities of Rb, Sr, and Zr in each artifact; those proportions can be matched with source patterns and assigned to parent obsidians.

This is an acceptable method, although it is not a replacement for more detailed and accurate techniques (see Andermann and Kemp 1958, Nielsen 1979). Different machines and techniques also have been found to produce slightly varying numerical results, due, in part, to particle-size effects of the variously processed rock standards. Direct comparisons between laboratories are, therefore, problematic.

DATA

The five specimens submitted for analyses posed certain problems relative to their small size and the large number of obsidian sources represented in archaeological assemblages from this region of California. Three samples from the 0-20 cm level possess ternary and Fe/Mn patterns consistent with the *Grasshopper Flat-Lost Iron Wells* source areas. The larger example (20L) is of sufficient size to produce reliable concentrations for the trace elements considered, however, these figures are notably lower than those for the source specimen. This might reflect a range of variation found within the obsidian field. A larger collection of source material is necessary to determine the accuracy of this proposal. One specimen is from *Medicine Lake*, while the final sample is similar to the *Tuscan* ternary-Fe/Mn pattern. The elemental concentrations of this latter specimen also appear to characterize a different portion of the source range, but again, larger source samples are needed to verify such a conclusion.

SOURCE DETERMINATION OF ARCHAEOLOGICAL OBSIDIAN SPECIMENS **CA-HUM-718**

TABLE 1. TRACE ELEMENT ANALYSES OF ARCHAEOLOGICAL OBSIDIAN SPECIMENS.

SAMPLE	RB ppm	SR ppm	ZR ppm	SUM	RB %	SR %	ZR %	Fe/Mn	SOURCE
718-20L	138.58	64.17	159.44	362.19	38.26	17.72	44.02	54.8	GRHP/LIW
718-20M	128.50	56.97	138.83	324.30	39.62	17.57	42.81	54.7	GRHP/LIW
718-20S	126.87	56.28	141.23	324.38	39.11	17.35	43.54	55.1	GRHP/LIW
718-40L	88.97	66.44	59.54	214.95	41.39	30.91	27.70	14.4	TUSCAN ?
718-40S	78.00	45.15	74.49	197.64	39.47	22.84	37.69	23.0	MED LAKE
gh/liw	179.39	80.47	191.87	451.73	39.71	17.81	42.47	53.4	
tuscan	76.24	87.7	49.53	213.47	35.71	41.08	23.20	14.3	
medlake	113.37	59.77	100.58	273.72	41.42	21.84	36.75	20.3	

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APPENDIX B

**SONOMA STATE UNIVERSITY
ACADEMIC FOUNDATION, INC.**

ANTHROPOLOGICAL STUDIES CENTER
CULTURAL RESOURCES FACILITY
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ARCATA RESOURCE AREA

Marlene Greenway, Archaeologist
Arcata Resource Area
Bureau of Land Management
1125 16th Street, Room 219
Arcata, California 95521-5580

April 24, 1990

Marlene:

This is our written report that provides the obsidian hydration measurement data for the five specimens from CA-HUM-718. These specimens were analyzed pursuant to BLM Requisition Order No. CA056-RQO-33 dated January 9, 1990.

The analysis was completed at the Sonoma State University Obsidian Hydration Laboratory, an adjunct of the Anthropological Studies Center, Department of Anthropology. Procedures used by our hydration lab for thin section preparation and hydration band measurement are described below.

The specimens were examined in order to find two or more surfaces that would yield edges which would be perpendicular to the microslides when preparation of the thin section was completed. Two small parallel cuts were made at an appropriate location along the edge of each specimen with a 4 inch diameter circular saw blade mounted on a lapidary trimsaw. The cuts resulted in the isolation of a small sample with a thicknesses of approximately one millimeter. Samples were removed from the specimens and mounted with Lakeside Cement onto permanently etched petrographic microslides.

The thickness of each sample was reduced by manual grinding with a slurry of #500 silicon carbide abrasive on a glass plate. The grinding was completed in two steps. The first grinding was terminated when the sample's thickness was reduced by approximate 1/2, thus eliminating any micro-chips created by the saw blade during the cutting process. The slides were then reheated, which liquified the Lakeside Cement, and the samples inverted. The newly exposed surfaces were then ground until the proper thickness was attained.

The correct thin section thickness was determined by the "touch" technique. A finger was rubbed across the slides, onto the samples, and the difference (sample thickness) was "felt." The second technique employed for arriving at proper thin section thickness is termed the "transparency" test. Each microslide was held up to a strong source of light and the translucency of the thin section observed. The sample was sufficiently reduced in thickness when the thin section readily allowed the passage of light.

A protective coverslip was affixed over the thin sections when all grinding was completed. The completed microslides are curated at our hydration lab under File No. 90-H895.

Marlene Greenway
April 24, 1990
Page 2

The hydration bands were measured with a strainfree 40 power objective and a Bausch and Lomb 12.5 power filar micrometer eyepiece on a Nikon petrographic microscope. Six measurements were taken at several locations along the edge of the thin sections. The mean of the measurements was calculated and given on the enclosed table. These hydration measurements have a range of ± 0.2 due to normal limitations of the equipment.

The specimens are enclosed.

Marlene, if you have any questions about this hydration work, please don't hesitate to contact me.

Cordially,



Thomas M. Origer, Director
Obsidian Hydration Laboratory

CA-HUM-718

Submitted by: Marlene Greenway - BLM

April 1990

Lab#	Catalog#	Description	Provenience	Remarks	Readings	Mean	Source
01	1	modified flake	Unit 1/0-20	none	1.0 1.1 1.1 1.1 1.1 1.1	1.1	GF (x)
02	2	debitage	Unit 1/0-20	none	3.2 3.2 3.3 3.3 3.5 3.5	3.4	GF (x)
03	3	debitage	Unit 1/0-20	none	1.7 1.8 1.8 1.8 1.8 1.8	1.8	GF (x)
04	4	debitage	Unit 1/20-40	band 1	3.9 3.9 3.9 4.1 4.1 4.2	4.0	T (x)
04	4	debitage	Unit 1/20-40	band 2	ranged from 5.5 to 7.4	VW	T (x)
05	5	debitage	Unit 1/20-40	none	2.7 2.9 2.9 3.0 3.0 3.1	2.9	MLH (x)

Lab Accession No.: 90-H895

Technician: Thomas M. Origer

